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Introduction

Welcome to the fourth edition of the *IAFOR Journal of the Social Sciences*. Our Journal encourages critical ideas and theories from different perspectives about society and aims to contribute to an open avenue for new theoretical developments in this broad field of the Social Sciences by providing a space for international dialogue and critical approaches.

The *IAFOR Journal of the Social Sciences* is an internationally peer-reviewed and editorially independent interdisciplinary journal. Streaming from the IAFOR series of Asian conferences for the social sciences, the Journal establishes a venue for academic research in a variety of complex and multifaceted fields of social science. The Journal takes into consideration cultural, political, social and economic phenomena through their historical developments and contemporary evolution. It explores the interplay between society, politics and economics; the dynamics of globalization and international relations. The Journal is committed to an approach based on scientific studies and is open for contributions from various disciplines including sociology, political science, anthropology, media and others.

All papers published in the Journal have been subject to the rigorous and accepted processes of academic peer review. Some of the articles are original submissions and some are significantly revised versions of previously presented papers or published reports from IAFOR's conferences and proceedings.

We would like to thank the contributors, reviewers and the editorial board for their work on this issue. We would like to express our deep appreciation to them for taking time from their busy schedules to review each assigned manuscript, offer their professional expertise, and make recommendations for improvement of these published manuscripts. Also, we would like to take this opportunity to acknowledge the hard work of our support staff at IAFOR who were involved in the publication of this journal.

Please note that we are seeking manuscripts for our upcoming 2018 issue. Below is the link to the journal's web page for your attention; please review this web page to become familiar with the journal's objectives and the submission guidelines for authors:

https://iafor.org/journal/iafor-journal-of-the-social-sciences/

If you have any questions, please do not hesitate to contact us. Otherwise please submit your manuscript via the manuscript submission form available on the journal website. Thank you for considering this invitation and we look forward to hearing from you soon.

Best regards,

Dr Tingting Ying
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Trade Creation and Trade Diversion of ASEAN's Preferential Trade Agreements

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Abstract

This paper analyzes the effects of ASEAN Preferential Trade Agreements (PTAs) and employs the gravity model over 2007-2011. The regressions include all 6 ASEAN PTAs in a single regression which is run separately. Our pool regression results show that ASEAN members trade with each other at a level higher than without preferential trade agreements. RCEP displays intra-bloc trade creation so as to ACFTA, AJCEP, and AIFTA. There have been stumbling-blocs in AANZFTA. Our results show that export trade diversion in AKFTA and most of the import extra-bloc trade dummies are not statistically significant. PTAs with higher external tariffs is likely to be associated with trade diversion. Also, the finding confirms that the results for the pooled regression and the results for individual regressions are different. Simultaneous estimation for all PTAs in a single regression enables us to avoid bias in the results by accounting for interactions among PTAs.

Keywords: preferential trade agreements, gravity model, ASEAN, Poisson pseudo-maximum-likelihood (PPML) estimation

Introduction

The Association of Southeast Asian Nations (ASEAN)[1] has signed six preferential trade agreements (PTAs[2]) with her trading partners since 1992. The ASEAN Free Trade Area (AFTA) is considered a "deep" FTA relative to others among developing countries because of its comprehensive coverage, ambitious liberalization to zero or near-zero rates, and timely implementation (Calvo-Pardo, Freund, & Ornelas, 2011). The Common Effective Preferential Tariff (CEPT) entered into force in 1993, developed to be the ASEAN Trade in Goods Agreement (ATIGA) in 2010 and intends to complete the ASEAN Economic Community[3] (AEC) in December 2015.

ASEAN has emerged as the integration hub for PTA activity in East Asia. Since 2007 five ASEAN+1 FTAs[4] have come into force, namely the ASEAN-Australia-New Zealand FTA (AANZFTA), the ASEAN-China FTA (ACFTA), the ASEAN-India FTA (AIFTA), the ASEAN-Japan Comprehensive Economic Partnership (AJCEP) and the ASEAN-Republic of Korea FTA (AKFTA). The start of the Regional Comprehensive Economic Partnership (RCEP) negotiations was announced officially in November 2012. ASEAN is taking further steps to establish the RCEP which will bring large advantages for ASEAN members and partners. There are four main areas of improvements that RCEP can bring about. First, the current ASEAN+1 FTAs have not yet achieved a fully liberalized region. The level of tariff liberalization is not sufficiently high and rules of origin (ROOs) are not liberal enough in some ASEAN+1 FTAs. Secondly, RCEP, being a common free trade framework across the East Asia region, will have more convergent rules which will reduce the "noodle-bowl" effects[5]. Third, The RCEP will help the region to achieve the Asia production network. Fourth, the RCEP will help strengthen the ASEAN Centrality being posed challenges by the "China-Japan-Korea FTA" and the Trans-Pacific Partnership[6] (TPP) (Fukunaga & Isono, 2013).

More interestingly, seven of sixteen countries in RCEP namely; China, Indonesia, Japan, the Republic of Korea, Malaysia, Singapore, Thailand; are the so-called "growth miracles," having achieved fast and high sustained growth in the postwar period (Word Bank, 2008). RCEP member countries' share of the world economy increased from 23.7 percent in 1992 to 26.8 percent in 2011. During the same period, their share in the total world exports and in the world imported increased from 18.8 percent to 26.8 percent and 17.6 percent to 26.7 percent respectively. In addition, compared to the rest of the world, trade in parts and components in RCEP member countries has grown faster than total world trade in manufacturing and has

[1]ASEAN is one of the world's most successful regional organizations. In 2012, ASEAN member nations had a combined population of 616.6 million at 8.6% of the total world population (NAFTA and the EU-28 had a combined population of 466 million and 507 million, respectively). ASEAN's combined GDP stands at US$ 2,311 billion (during the 2009-2012, ASEAN's GDP has grown at an average rate of 17 %). Total trade of around US$ 2,476 billion (during the 2009-2012, ASEAN's total trade has grown at an average 20.4%). The average tariff rate on intra-ASEAN6 imports has been reduced to just 0.04% (AFTA stated at more than 12%) while of CLMV was at 1.37%. ASEAN's FDI inflow was US$110 billion (ASEAN, 2013). ASEAN was established in 1967 by Indonesia, Malaysia, the Philippines, Singapore, and Thailand.

2 In this study, we use the generic term PTA to denote all forms of reciprocal preferential trade agreements, including bilateral and plurilateral agreements. Note that the World Trade Organization employs the term PTA for all both all reciprocal agreements and for nonreciprocal preferential agreements such as the Generalized System of Preferences (GSP).

[3] AEC envisage four parts; a single market and production base, a competitive economic region, equitable economic development, and integration into the global economy.

[4] Date of Entry into Force: AANZFTA (2010), ACFTA (2010), AIFTA (2009), AJCEP (2008), AKFTA (2006). ASEAN-USA and ASEAN-European Union are under negotiation.

[5]As of December 2014, the number of concluded PTAs includes Brunei (8), Cambodia (6), Indonesia (7), Laos (9), Malaysia (13), Myanmar (6), Philippines (7), Singapore (43), Thailand (10), Vietnam (8), China (18), Japan (14), Korea (12), Australia (10), New Zealand (9), and India (11) (www.aric.adb.org downloaded December 2014).

[6] As of December 2014, there are 4 ASEAN countries participate TPP, Brunei, Malaysia, Singapore, and Vietnam (http://tppinfo.org/).

grown faster than anywhere else in the world (Athukorala, 2011). Accordingly, RCEP economic status has become significant in the world.

The intra-ASEAN trade by means of the intraregional trade intensity index,[7] ranging between 3.59 percent and 4.35 percent during 2007–2012, indicates that in ASEAN trade there is a regional bias. In other words, ASEAN trade among member countries is greater than would be expected given ASEAN's importance in world trade. The ASEAN score on this index is also significantly higher than for other region, including the European Union, North American, Africa, Latin America, and Middle East, except the Central and West Asia. However, the slight decline in ASEAN's intraregional trade intensity over the past five years shows that intra-ASEAN trade is decreasing relative to the world's share of trade with ASEAN.

Table 1: The intraregional trade intensity index 2007–2012 (percent)

Region	2007	2008	2010	2012	2015
European Union	1.74	1.76	1.88	1.95	1.99
North America	2.06	2.12	2.03	2.03	1.85
Africa	3.83	3.58	4.44	4.30	5.64
Latin America	3.66	3.65	3.26	2.99	2.76
Middle East	2.88	2.39	2.99	2.39	3.88
Central and West Asia	10.60	6.73	9.08	7.46	na
South Asia	2.96	2.51	1.95	1.70	2.18
ASEAN	4.32	4.27	3.77	3.57	3.25
ASEAN+3	2.00	1.97	1.79	1.74	1.69
ASEAN+6	n.a.				

Source: ASIA Regional Integration Center (Accessed November 10, 2017)

This paper aims at investigating the performance of the PTAs in ASEAN, using PPML with a current dataset, from 2007–2011. We estimate the trade effects from RCEP and the other 6 ASEAN RTAs simultaneously using internal-external trade-creation-diversion models.

Theoretical Framework for Economic Analysis of PTAs

Since Viner (1950), we know that the formation of a PTA can bring to trade creation and/or trade diversion. There is a sizable literature that contributes to the theory of PTAs since Viner's pioneering work. Plummer, Cheong, and Hamanaka (2010) conducted a review of the theoretical framework for economic analysis of PTAs.

Before Viner's model, the conventional wisdom was that PTAs would tend to improve welfare. Viner's single partial equilibrium model shows that PTAs allows some domestic production to be replaced by imports from more efficient firms located in preference-receiving countries, leading to welfare gains (trade creation). At the same time, PTAs may reduce imports from more efficient non-member countries, implying a welfare loss (trade diversion). The net

[7] Intra-regional trade intensity index is the ratio of intra-regional trade share to the share of world trade with the regional. It is computed as: $(T_{ii}/T_i)/(T_i/T_w)$ where T_{ii} is exports of region i to region i plus imports of region i from region i; T_i is total exports of region i to the world plus total imports of region i from the world; and the T_w is total world exports plus imports. This index determines if trade within the region is greater or smaller than should be expected on the basis of region's importance in world trade. An index of more than one indicates that trade flow within the region is larger than expected given the importance of the region in world trade (ARIC, 2013). The intraregional trade intensity index is the better measure than the intraregional trade shares (Frankel, 1996).

welfare effect of PTAs depends on the relative magnitude of these opposing effects. Meade (1955), Lipsey (1970), and Wonnacott and Wonnacott (1982) formulated a general framework based on general equilibrium models. Meade-Lipsey and Wonnacotta-Wonnacott models conclude that a group of small countries may gain from a PTA rather than unilateral liberalization if outsiders have high trade barriers against them or the group faces high transport costs in exporting to outsiders. The model also points out that countries do not engage in PTAs simply to reduce their own tariffs, countries do it in order to open up access to their PTA partner's markets, then a PTA produces gains for its members. Lloyd and Maclaren (2004) present higher dimensions in terms of commodities and trading partners to evaluate the welfare impact of a PTA. This model also estimates the magnitude of changes in a country's welfare and does assume away noncompetitive behavior and economies of scales. Panagariya and Krishna (2002) extended Kemp-Wan Theorem (1976) to consider whether PTA can always be efficient if constructed correctly. The model required three elements. First, if there is potential trade diversion from one outsider market, then external tariffs would have to be lowered to insure that the discrimination inherent in the PTA does not change trade with that market. Second, the PTA would have to embrace total internal free trade, thereby leading to greater efficiency through trade creation. Third, in the case of countries being worse off with an agreement, there would have to be a compensation mechanism. However, there are at least two problems with this type of open regionalism in the real world. First from a political perspective, it is somewhat ingenuous to expect that PTA members would extend liberalization efforts to outsiders without any reciprocity. Second, it is difficult to implement a compensation mechanism (Plummer, Cheong, & Hamanaka, 2010).

In addition, there are dynamic implications of PTAs. The dynamic effects in the context of PTAs are: economies of scale and variety of goods, technology transfer and foreign direct investment (FDI), structural policy changes and reform, and competitiveness and long-run growth effects (Plummer, Cheong, & Hamanaka, 2010).

Empirical analysis of PTAs falls into two categories ex-ante which is to anticipate the possible economic consequences of any given PTA and ex-post which is to analysis the effects of a PTA once it is already in place. Ex-ante assessments are usually based on computable general equilibrium model (CGE). Ex-post assessment employs data available and focuses on the effect of PTAs on the trade shares of members and nonmembers and the gravity model is the key ex-post technique (Rivera-Batiz & Oliva, 2004) (Plummer, Cheong, & Hamanaka, 2010).

In our study, we utilize the gravity model. The definitions of the terms trade creation and trade diversion differ from the welfare-effect definitions given by Viner (1950). We follow the definitions in Johnson (1962) and Endoh (1999).

Gravity Model[8] and Data

The first extended use of three dummy variables[9] in order to offer a simple and clear distinction between trade creation and trade diversion was done by Soloaga and Winters (2001).This paper is an influential study on the gravity model to test the PTA effect. They indicated that both are

[8] The first introduced the gravity model in the international trade by Nobel laureate Timbergen (1962) and Linnemann (1966) made the first attempt to provide theoretical support for the model.

[9]Aitken (1973) was the first applied gravity model to RTAs by using regional dummy variable. Bayoumi & Eichengreen (1995) added a second dummy to capture the effects of extra-bloc trade. Later, Soloaga and Winter (2001) added three dummies.

needed because bloc member's imports and exports could follow different patterns after the formation of a PTA.

Here we follow MacPhee and Sattayanuwat (2014). They employed three dummies following Soloaga and Winters (2001) and expressed a typology of trade creation and diversion drawn up by Trotignon (2010).

The first dummy captures trade creation and the second and the third dummy variables capture import trade diversion and the export trade diversion, respectively.

Equation (1) is a gravity model explaining bilateral trade flows with GDP, population, language, distance, adjacency, real exchange rate, and trade policy variables.

X_{ijt} = f ($Y_{it}, Y_{jt}, N_{it}, N_{jt}, LANG_{ij}, ADJ_{ij}, DIS_{ij}, RER_{ijt}, TAF_{ijt}, PTA2_{kijt}, PTAimp_{kijt}, PTAexp_{kijt}$,) (1)

where

X_{ijt} = the value of exports from exporter country i to importer country j in year t,

Y_{it} = the gross domestic product of exporter country i in year t,

Y_{jt} = the gross domestic product of importer country j in year t,

N_{it} = the population size of exporter country i in year t,

N_{jt} = the population size of importer country j in year t,

$LANG_{ij}$ = a dummy variable indicating that country i and country j have a commonlanguage,

ADJ_{ij} = a dummy variable indicating that country i and country j have a commonborder,

DIS_{ij} = the distance between country i and country j,

RER_{ijt} = the real exchange rate between country i and country j in year t,

TAF_{ijt} = the average tariff rate between country i and country j in year t,

$PTA2_{kijt}$ = a dummy variable indicating that country i and j are members of the same

RTA k in year t. A positive coefficient indicates that the intra-bloc trade would be greater. This effect refers to as "Intra-bloc Trade Creation (ITC)."

$PTAimp_{kijt}$ = a dummy variable for country i that is not member of the group k of which country j is a member in year t. A positive coefficient for this variable indicates that number countries are importing more from non-member. This refers to as "Import Trade Creation (MTC)."

$PTAexp_{kijt}$ = a dummy variable indicating that country i is a member of the group k of which country j is not a member in year t. A positive coefficient for this variable indicates that number countries are exporting more to non-members. This effect refers to as "Export Trade Creation (XTC)."

The model includes the import-country-fixed effect, the export-country-fixed effect, and the year-fixed effect to overcome the problem of heterogeneity which is omitted from the rest of

model specification, such as preferences, institutional difference and so on. Note that several studies suggested a fixed-effects specification[10] to deal with the problem.

In summary, we interpret the respective signs and relative values of the intra-bloc (RTA2) and extra-bloc (RTAexp and RTAimp) coefficients in Table 2.

Our empirical study consists of a panel of 153 countries for the period from 2007 to 2011. The main purpose of this study is to test the impact of the PTAs among ASEAN using the gravity model. We use unbalanced panel data of export taken from the PC-TAS-HS Revision 2 2007–2011, International Trade Centre; covering 156 countries covering a 5-year period from 2007–2011 with 49,708 observations. GDP and population are from the World Economic Outlook Database, IMF. The data on tariffs is from the United Nations TRANS, World Integrated Trade Solution (WITS). The data on geographical and cultural proximity, such as distance, adjacency and common language, come from the CEPII database.

We estimate two types of specifications of equation (1). The first includes 7 ASEAN PTAs in a single regression in order to examine the overall effects of trade. The second estimation estimates each ASEAN PTA alone in 7 separate regressions.

Table 2: Trade Creation, Trade Diversion, and Typology of Blocs

Expected Sign			Differences in Absolute Size	Building Bloc vs. Stumbling Blocs[11]
PTA2	PTAexp	PTAimp		
+ ITC	+ XTC	+ MTC		Building Blocs
+ ITC	+ XTC	- MTD	PTA2 > |PTAimp|	Building Blocs
			PTA2 < |PTAimp|	Stumbling Blocs
+ ITC	- XTD	+ MTC	PTA2 > |PTAexp|	Building Blocs
			PTA2 < |PTAexp|	Stumbling Blocs
+ ITC	- XTD	- MTD	PTA2 > |PTAexp + PTAimp|	Building Blocs
			PTA2 < |PTAexp + PTAimp|	Stumbling Blocs

Source: Adapt from (Trotignon, 2010), Table 4, p.242
Note: ITC = Intra-bloc Trade Creation, XTC (D) = Export Trade Creation (Diversion), and MTC = Import Trade Creation (Diversion)

We review and update the recent empirical literature published during 2000–2014; focusing on ASEAN. We focus only on the study that utilizes an extension of three dummy variables

[10] Mátyás (1997) made the first propose of a triple-index model. Anderson and van Wincoop (2003) showed theoretically that the traditional specification of the gravity model suffers from omitted variables bias and proposed a country-specific fixed-effects specification. Kepaptsoglou et al. (2010) summarized the related empirical studies published over 1999–2009 and concluded that the fixed-effects model tends to provide better results.

[11] A building block is to PTA assist to the multilateral trading system or at least do not hinder multilateralism. A stumbling block is to PTA damage to the multilateral trading system or slow multilateral tariff cutting. There are differences in opinion regarding international trade integration arrangements. For the debate on whether regional arrangements are building or stumbling blocks, the literature has not reached any consensus. See (Baldwin & Seghezza, 2010) (Bagwell & Staiger, 1998) (Bhagwati, 1995, 2008) (Bhagwati, Greenaway, & Panagariya, 1998) (Baldwin, Cohen, Sapir, & Venables, 1999) (Ethier, 1998) (Estevadeordal, Freund, & Ornelas, 2008) (Frenkel, 1997) (Krugman, 1991, 1995) (Krueger, 1999) (Laird, 1999) (Limão,2007) (Lipsey & Smith,1989, 2011) (McLaren, 2002) (Panagariya, 1999, 2000) (Snape, 1996) (Schiff & Winters, 2003).

capturing trade creation, export trade creation, and import trade creation in the gravity model. Most of the literatures conclude that ASEAN trade bloc has been found to generate intra-trade creation namely Endoh (2000), Carrere (2004, 2006), Elliott &Ikemoto (2004), Kien & Hashimoto (2005), Kien (2009), Acharya et al. (2011), Cissokhoet al. (2013), and MacPhee & Sattayanuwat (2014). A few studies show that ASEAN have intra-trade diversion namely Soloaga & Winters (2001) and Tumbarello (2007). In addition, MacPhee & Sattayanuwat (2014) found that the results for the pooled regression and the results for individual regression are different and they conclude that simultaneous estimation for all 12 RTAs in a single regression enables us to avoid bias the results by accounting for interactions among RTAs.

Table 3: Recent Literature using three Regional Dummy Variables Studying ASEAN's PTA

Study	Empirical Approach	Period & # of countries	Results
(Endoh, 2000)*	OLS	1995	ASEAN: RTA2 = (+), RTAexp = (+), RTAimp = (+) EAEC: RTA2 = (+), RTAexp = (+), RTAimp = (+)
(Soloaga & Winters, 2001)*	Tobit	1980-1996 58 Countries	ANDEAN: RTA2 = (+), RTAexp = (-), RTAimp = (-) ASEAN: RTA2 = (-), RTAexp = (+), RTAimp = (+) CACM: RTA2 = (+), RTAexp = (-), RTAimp = (-) EU: RTA2 = (-), RTAexp = (+), RTAimp = (+) EFTA: RTA2 = (n), RTAexp = (+), RTAimp = (+) GULFCOOP:RTA2 = (+), RTAexp = (-),RTAimp = (n) LAIA: RTA2 = (+), RTAexp = (-), RTAimp = (-) MERCOSUR:RTA2 = (+), RTAexp = (n),RTAimp = (-) NAFTA: RTA2 = (n), RTAexp = (n), RTAimp = (+)
(Carrere C. , 2004)*	Hausman-Taylor	1962-1996	ANDEAN: RTA2 = (+), RTAexp = (-), RTAimp = (-) ASEAN: RTA2 = (+), RTAexp = (+), RTAimp = (+) CEMAC: RTA2 = (+), RTAexp = (-), RTAimp = (-) COMESA: RTA2 = (n), RTAexp = (-), RTAimp = (n) ECOWAS: RTA2 = (+), RTAexp = (-), RTAimp = (+) MERCOSUR: RTA2 = (+), RTAexp = (+), RTAimp = (-) SADC: RTA2 = (+), RTAexp = (+), RTAimp = (-) UEMOA: RTA2 = (+), RTAexp = (-), RTAimp = (-)
(Elliott & Ikemoto, 2004)*		1982-1999	ASEAN: RTA2 = (+), RTAexp = (+), RTAimp = (+) EU: RTA2 = (+), RTAexp = (+), RTAimp = (+) NEFTA: RTA2 = (+), RTAexp = (-), RTAimp = (-)
(Kien & Hashimoto , 2005)*	Hausman-Taylor	1988-2002 39 countries	ASEAN: RTA2 = (+), RTAexp = (+), RTAimp = (+) EU: RTA2 = (-), RTAexp = (n), RTAimp = (-) MERCOSUR:RTA2 = (+), RTAexp = (-),RTAimp = (+) NAFTA: RTA2 = (+), RTAexp = (-), RTAimp = (+)
(Carrere C. , 2006)		1962-1996 130 countries	ANDEAN: RTA2 = (+), RTAexp = (-), RTAimp = (-) ASEAN: RTA2 = (+), RTAexp = (+), RTAimp = (-) CACM: RTA2 = (+), RTAexp = (n), RTAimp = (-) EU: RTA2 = (+), RTAexp = (+), RTAimp = (+) EFTA: RTA2 = (n), RTAexp = (-), RTAimp = (n) LAIA: RTA2 = (+), RTAexp = (n), RTAimp = (-) MERCOSUR: RTA2 = (n),RTAexp = (n), RTAimp = (-) NAFTA: RTA2 = (n), RTAexp = (n), RTAimp = (-)

(Tumbarelle, 2007)*	Log linear / OLS	1984-2005 182 countries	ASEAN: RTA2 = (-), RTAexp = (+), RTAimp = (+) APEC: RTA2 = (+), RTAexp = (+), RTAimp = (+) CER: RTA2 = (+), RTAexp = (+), RTAimp = (-) EU15: RTA2 = (-), RTAexp = (+), RTAimp = (+) EAEC: RTA2 = (n), RTAexp = (+), RTAimp = (-) MERCOSUR: RTA2 = (+),RTAexp = (+),RTAimp = (-) NAFTA:RTA2 = (n), RTAexp = (+), RTAimp = (n) SAFTA:RTA2 = (n), RTAexp = (+), RTAimp = (+)
(Kien, 2009)	Hausman-Taylor	1988-2002 32 countries	ASEAN: RTA2 = (n), RTAexp = (+), RTAimp = (+) EU15: RTA2 = (-), RTAexp = (-), RTAimp = (-) MERCOSUR:RTA2 = (+),RTAexp = (+), RTAimp = (-) NAFTA: RTA2 = (+), RTAexp = (-), RTAimp = (-)
(Acharya, Crawford, Maliszewska, & Renard, 2011)	Country-pair dummies & a time dummy	1970-2008 179 countries	ASEAN:RTA2 = (+), RTAexp = (+), RTAimp = (+) ANZCERTA: RTA2 = (n), RTAexp = (-), RTAimp = (n) CACM:RTA2 = (n), RTAexp = (+), RTAimp = (+) CAN:RTA2 = (+), RTAexp = (+), RTAimp = (n) CARICOM:RTA2 = (-), RTAexp = (-), RTAimp = (-) CEFTA:RTA2 = (n), RTAexp = (-), RTAimp = (-) CEMAC:RTA2 = (n), RTAexp = (+), RTAimp = (+) CIS:RTA2 = (-), RTAexp = (+), RTAimp = (+) COMESA: RTA2 = (-), RTAexp = (-), RTAimp = (-) EAC:RTA2 = (+), RTAexp = (+), RTAimp = (+) ECOWAS:RTA2 = (+), RTAexp = (+), RTAimp = (+) EFTA:RTA2 = (+), RTAexp = (+), RTAimp = (+) EU:RTA2 = (+), RTAexp = (+), RTAimp = (n) Euromed:RTA2 = (+), RTAexp = (+),RTAimp = (+) GCC:RTA2 = (+), RTAexp = (+), RTAimp = (+) MERCOSUR: RTA2 =(+),RTAexp = (+),RTAimp = (+) NAFTA:RTA2 = (+), RTAexp = (+), RTAimp = (+) PATCRA:RTA2 = (n), RTAexp = (+), RTAimp = (+) SADC:RTA2 = (+), RTAexp = (-), RTAimp = (n) SAFTA:RTA2 = (+), RTAexp = (+), RTAimp = (+) WAEMU: RTA2 = (+), RTAexp = (+), RTAimp = (n)
(Cissokho, Haughton, Makpayo, & Seck, 2013)	Tobit	2000, 2003, 2006 135 countries	ASEAN: RTA2 = (+), RTA_extra = (+) COMESA: : RTA2 = (+), RTA_extra = (n) ECOWAS: RTA2 = (+), RTA_extra = (-) EU: RTA2 = (-), RTA_extra = (+) MERCOSUR: RTA2 = (+), RTA_extra = (+) NAFTA: RTA2 = (-),RTA_extra = (+) SADC: RTA2 = (+), RTA_extra = (n)
(MacPhee & Sattayanuwat, 2014)	PPML / one single regression	1981-2008 158 countries	ASEAN: RTA2 = (+), RTAexp = (n), RTAimp = (+) ANDEAN: RTA2 = (n), RTAexp = (n), RTAimp = (-) CEMAC: RTA2 = (n), RTAexp = (n), RTAimp = (-) CIS: RTA2 = (+), RTAexp = (-), RTAimp = (-) EAC: RTA2 = (+), RTAexp = (-), RTAimp = (-) ECOWAS: RTA2 = (+), RTAexp = (n), RTAimp = (-) GCC: RTA2 = (-), RTAexp = (n), RTAimp = (+) MERCOSUR: RTA2 = (+),RTAexp = (n), RTAimp = (-) PAFTA: RTA2 = (-), RTAexp = (+), RTAimp = (n) SADC: RTA2 = (+), RTAexp = (+), RTAimp = (+)

	PPML / 12 RTAs in separate regression		ASEAN: RTA2 = (+), RTAexp = (+), RTAimp = (+) ADEAN: RTA2 = (+), RTAexp = (+), RTAimp = (n) CEMAC: RTA2 = (-), RTAexp = (-), RTAimp = (-) CIS: RTA2 = (+), RTAexp = (-), RTAimp = (-) EAC: RTA2 = (+), RTAexp = (+), RTAimp = (+) ECOWAS: RTA2 = (+), RTAexp = (n), RTAimp = (n) GCC:RTA2 = (-), RTAexp = (n), RTAimp = (-) MERCOSUR: TA2 = (+), RTAexp = (+),RTAimp = (+) PAFTA: RTA2 = (-), RTAexp = (+), RTAimp = (n) SADC: RTA2 = (n), RTAexp = (+), RTAimp = (n)

Source: * by (MacPhee & Sattayanuwat, 2014) and Authors' review

Econometric Issues

Silva and Tenreyro (2006) initially proposed the Poisson Pseudo-Maximum-Likelihood (PPML) estimation technique in order to solve the traditional problem of gravity models with heteroskedasticity and zero trade values. They showed that the proposed PPML estimation technique as being capable of solving those problems. PPML has become an influential estimation technique in the present decade. Also, it is easily applied to the gravity model because STATA contains a built in *poisson* command.[12] Given this, a number of empirical studies[13] of gravity models apply the PPML estimator.

However, it suffers from failing to check for the existence of the estimates, and it is also sensitive to numerical problems. Silva and Tenreyro (2010) developed a better option, *ppml* command[14], which checks for the existence of the estimates before trying to estimate a Poisson regression and provides several warning about possible convergence problems (Santos Silva & Tenreyro, 2006) (Santos Silva & Tenreyro, 2011). We follow the *ppml* command.

It should be noted that some authors try to find an argument against the PPML estimator. A Gamma Pseudo-Maximum-Likelihood (GPML), a Nonlinear Least Squares (NLS) estimator, Feasible Generalized Least Squares (FGLS) estimator (Martínez-Zarzoso, 2013), and Negative binomial pseudo-maximum likelihood estimator (NBPML) (Sukanuntathum, 2013) are compared to the PPML. Recently the simulation results confirm that the PPML estimator is generally well behaved, even when the proportion of zeros in the sample is very large. In addition to being compared with FGLS, Tobit, and Heckman, the Ramsey RESET Test confirms that PPML the only one of the regression methods tested that is adequate (MacPhee, Cook, & Sattayanuwat, 2013)

Regression Results

The results of regressions are presented in Table 4. The first two regressions include all 6 ASEAN PTAs in a single regression. The other regressions run each ASEAN PTA separately. This is the unbalanced panel with 49,708 observations containing 153 exporters and 169 importers during the period of 2007–2011. All of the fixed effect regressions explain a high proportion, above 92 percent of the total variation of world export. Most of the control variables have the expected sign and are statistically significant namely the level of GDP and population of exporter and importer, distance, language, and contiguity.

[12] poisson depvar [indepvars] [if] [in] [weight] [, options]
[13] (An & Puttitanun, 2009), (Liu, 2009), (Shepherd & Wilson, 2009), (Siliverstovs & Schumacher, 2009), (Westerlund & Wilhelmsson, 2011), (Martínez-Zarzoso, 2013), (MacPhee & Sattayanuwat, 2014)
[14] ppml depvar [indepvars]

The PPML results indicate that during 2007–2011, the outcomes for the pooled regression differs from some of the ones of individual regressions. We focus on the pooled regression with the fixed effect model.

For AFTA regressions, the pooled result and individual AFTA result differed. The individual AFTA regression results indicate the AFTA agreement seems to continue increased trade among its members and export trade creation while the pooled regression result are insignificant. Both our pooled regression and individual ACFTA regressions contain the same coefficient sign for ACFTA2 and ACFTAexp that are positive and statistically significant. This suggests that the countries of ASEAN and China give rise to intra-bloc trade creation and export trade creation. Our results are consistent with Yang & Martínez-Zarzoso (2013) who found ACFTA yield not only intra-bloc trade creation but also extra-bloc export trade creation. Park et al (2008) present that economic modeling of ACFTA shows substantial mutual gains from trade (i.e trade creation). They estimate a 32.5% increase in ASEAN in ASEAN-PRC trade, with gains ranging from 20%–60% for individual countries (the higher end by Thailand and Viet Nam). They suggest that improving infrastructure connections to boost gain from trade. In sum, ACFTA favors not only ACFTA's intra-regional trade growth but also benefits extra-bloc countries.

For AJCEP regressions, the *AJCEP2* dummy is the only significant variable in the regression. Both the pooled result and individual result show intra-bloc trade creation. In the case of AKFTA, our pooled results indicate that AKFTA displays export trade diversion while the AKFTA individual regression result display the other way around.

The pooled regression results show that AANZFTA experienced intra-bloc trade diversion, export trade diversion, and import trade creation. On balance, the sum of the coefficients of the three statistically significant dummy variables [(-7.88) + (-8.94) + 0.03] equal -16.79. This indicates that the AANZFTA seems to have more trade flows among non-AANFTA random country pairs than its members.

In the case of AIFTA, our PPML estimates identified positive intra-bloc trade creation and export trade creation.

The last forth incoming ASEAN PTA is RCEP. Both our pooled regression and individual RCEP regression suggest that RCEP give rise to intra-bloc trade creation and export trade creation. In other words, RCEP is favorable to both regional integration and globalization.

Conclusion

We summarize the ASEAN's PTA trade effects in table 5. On average, during 2007–2011, ASEAN members trade with each other at a level higher than without preferential trade agreements.

Our first major finding is that not all of the ASEAN's PTAs reaches intra-bloc trade creation Most of the ASEAN's PTA displays building-blocs, namely ACFTA, AJCEP, AIFTA and RCEP. There were stumbling-blocs in AKFTA and AANZFTA. The results show that export trade diversion in AKFTA.

The second finding is that RCEP coefficients show higher magnitude than other of ASEAN's PTAs. This interprets that the RCEP is more desirable than the ASEAN's bilateral PTAs. RCEP

tend to enhance trade flows than ASEAN bilateral trade agreements. In sum, the 2007–2011 effects of the gravity model results provide a strong rationale for supporting RCEP. The result also implies that since most of the ASEAN's PTA indicate the building-blocs, thus RCEP is able to provide deeper economic cooperation that those in the ASEAN+1 PTAs.

The third finding is that the stronger PTA, the higher the chance of stumbling blocs. On the other hand, weaker PTAs mean a higher chance of building blocs. This finding implies that PTA with the higher external tariff is likely to be associated with trade diversion.

Our fourth finding is that we confirm MacPhee & Sattayanuwat (2014) in that the results for the pooled regression and the results for individual regressions are different. Simultaneous estimation for all PTAs in a single regression enables us to avoid bias in the results by accounting for interactions among PTAs.

Table 4: Intra and Extra-Bloc Effects of ASEAN's Preferential Trade Agreements by PPML (2007-2011)

Variable	All	AFTA	ACFTA	AJCEPA	AKFTA	AANZFTA	AIFTA	RCEP
Exp. GDP	0.53***	0.52***	0.52***	0.52***	0.52***	0.52***	0.52***	0.52***
	(0.14)	(0.19)	(0.19)	(0.18)	(0.18)	(0.18)	(0.18)	(0.17)
Imp.GDP	0.75***	0.74***	0.74***	0.74***	0.74***	0.74***	0.74***	0.74***
	(0.14)	(0.17)	(0.16)	(0.16)	(0.16)	(0.16)	(0.17)	(0.16)
Exp. Pop.	-2.24**	-2.23**	-2.21**	-2.22**	-2.22**	-2.23**	-2.23**	-2.24**
	(1.09)	(1.12)	(1.13)	(1.12)	(1.12)	(1.12)	(1.12)	(1.11)
Imp. Pop	0.03*	0.06	0.06	0.06	0.06	0.06	0.06	0.05
	(0.43)	(0.45)	(0.45)	(0.44)	(0.45)	(0.45)	(0.45)	(0.44)
Imp. Tariff	-0.11	-0.10	-0.11	-0.10	-0.11	-0.11	-0.11	-0.10
	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)
EX. Rate	-0.33*	-0.34	-0.34	-0.34*	-0.34	-0.34	-0.34	-0.34*
	(0.18)	(0.21)	(0.21)	(0.20)	(0.21)	(0.21)	(0.21)	(0.20)
Distance	-0.81***	-0.71***	-0.72***	-0.69***	-0.70***	-0.69***	-0.71***	-0.78***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Lang	0.36***	0.37***	0.40***	0.39***	0.37***	0.38***	0.37***	0.36***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Contiguity	0.61***	0.71***	0.71***	0.68***	0.69***	0.70***	0.71***	0.65***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Col	0.32***	0.11	0.13	0.19**	0.15	0.12	0.12	0.12
	(0.09)	(0.10)	(0.09)	(0.09)	(0.10)	(0.10)	(0.10)	(0.09)
AFTA2	-3.34	5.83***						
	(0.31)	(2.12)						
AFTAexp		5.31**						
		(2.14)						
AFTAimp		0.46						
		(1.03)						
ACFTA2	6.27***		5.71***					
	(2.31)		(2.12)					
ACFTAexp	5.62**		5.43**					
	(2.38)		(2.15)					
ACFTAimp	0.43		0.62					
	(0.96)		(1.04)					

AJCEP2	0.71***			6.16***				
	(0.26)			(2.12)				
AJCEPexp	-0.25			5.18**				
	(0.22)			(2.15)				
AJCEPimp	-0.22			0.35				
	(0.15)			(1.01)				
AKFTA2	-1.27				6.00***			
	(1.17)				(2.12)			
AKFTAexp	-2.53**				5.27**			
	(1.20)				(2.14)			
AKFTAimp	0.23				0.44			
	(0.51)				(1.02)			
AANZFTA2	-7.88**					6.05***		
	(3.67)					(2.12)		
AANZFTAexp	-8.94**					5.28**		
	(3.83)					(2.14)		
AANZFTAimp	0.03**					0.44		
	(1.59)					(1.02)		
AIFTA2	4.23*						5.88***	
	(2.21)						(2.12)	
AIFTAexp	3.77*						5.30***	
	(2.28)						(2.14)	
AIFTAimp	-0.23						0.45	
	(0.91)						(1.02)	
RCEP2	7.08***							5.75***
	(2.65)							(2.07)
RCEPexp	7.54***							5.48**
	(2.74)							(2.13)
RCEPimp	0.14							0.61
	(1.38)							(1.01)
Constant	18.96***	18.04***	18.07***	17.87***	18.00***	17.94***	18.01***	18.68***
	(2.91)	(2.99)	(3.01)	(2.99)	(2.99)	(2.99)	(2.99)	(2.96)
Pseudo R^2	0.942	0.922	0.922	0.927	0.923	0.923	0.922	0.928

Source: Authors' Calculation. Standard errors in parentheses* $p<10\%$ ** $p<5\%$ *** $p<1$

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Learning of Research at Doctoral Level: Perceptions of International Doctoral Students at a South-Central Texas Private University

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Abstract

The number of international doctoral students in American universities continues to grow, and very little is known about their learning of research. This study explored international doctoral students' views and perceptions in learning of research at a private faith-based South-Central Texas university in the United States. The literature on the subject is limited and this study aimed at covering the gap that exists in this domain. Through this basic interpretative qualitative study, findings revealed that international doctoral students value taking courses, collaborating with others, working individually, and using available resources at the university in their learning of research. Understanding of international students and the issues they face, may help in their retention, success and understanding of their learning of research. It is recommended that the universities in the United States support international students so that these underrepresented population succeed in their studies.

Keywords: international doctoral students, United States, learning of research, basic interpretative qualitative research design, mentoring, doctoral courses

Introduction

The United States is the top destination of choice for international students in higher education (Witherell & Clayton, 2014). The number of international students enrolled in U.S. higher education was 1,043,839 in 2015/16 with a reported increase of 7% from the prior year and contributed $35.8 Billion to the US economy (IIE 2017), as reflected in Figure 1. This has resulted in American higher education becoming increasingly diverse with the number of students from other countries enrolling in colleges and universities across the United States (Mukminin & McMahon, 2013).

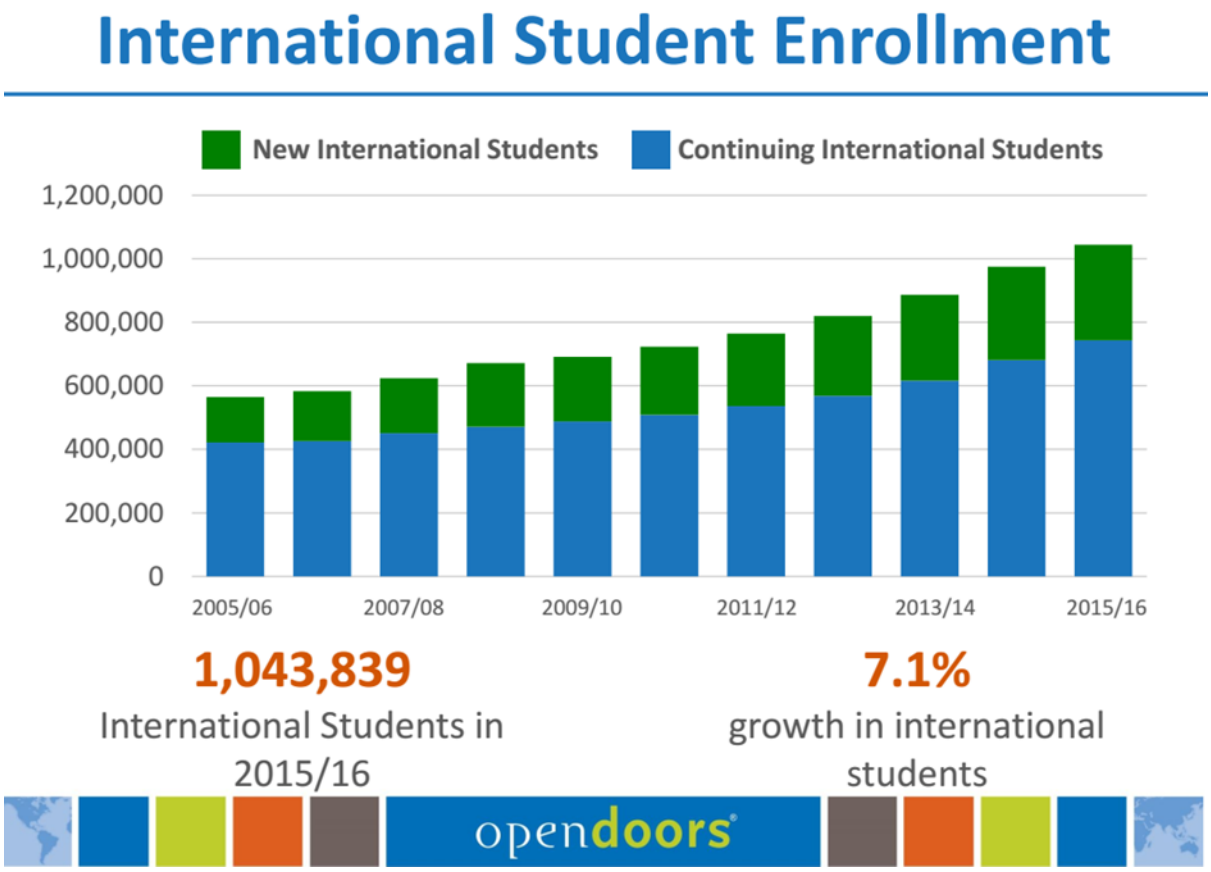

Figure 1**:** International Students in the United States 2015/16.
Source: Institute for International Education (2016).
https://www.iie.org/Research-and-Insights/Open-Doors/Fact-Sheets-and-Infographics/Infographics

The United States as a country is supportive of the influx of international students as Americans will learn to build relationships, study and work with people from other countries (IIE, 2017). Among the increasing number of international students are doctoral students who enter American universities with no or different experiences of doing research (Lee & Rice, 2007). The way of doing research in America may be different from the way universities from other countries do it; hence international students may face problems in learning research at American universities (Wu, Garza, & Guzman, 2015).

Purpose of the Study

The purpose of this basic interpretative qualitative study is to explore learning of research experiences and perceptions by international doctoral students who have completed research courses at a private faith-based South-Central Texas university in the United States.

Significance of the Study

The internationalization of higher education's goal is to produce citizens of the world and this process is fueled by academic and economic causes. There are several factors which contribute to internationalization of higher education in the United States. First higher education must provide the essential academic and professional training for its graduates to meet the specific needs of globalized nations, market labors and economies. Cultural competencies and multilingualism will play an essential role in the institutions of higher education that provide this preparation. The degree of specialization in research in specific fields will require international collaboration. The recruitment of international students provides a great deal of revenue both to the universities and the host countries (Zha Qiang, 2003), demonstrated in Figure 2.

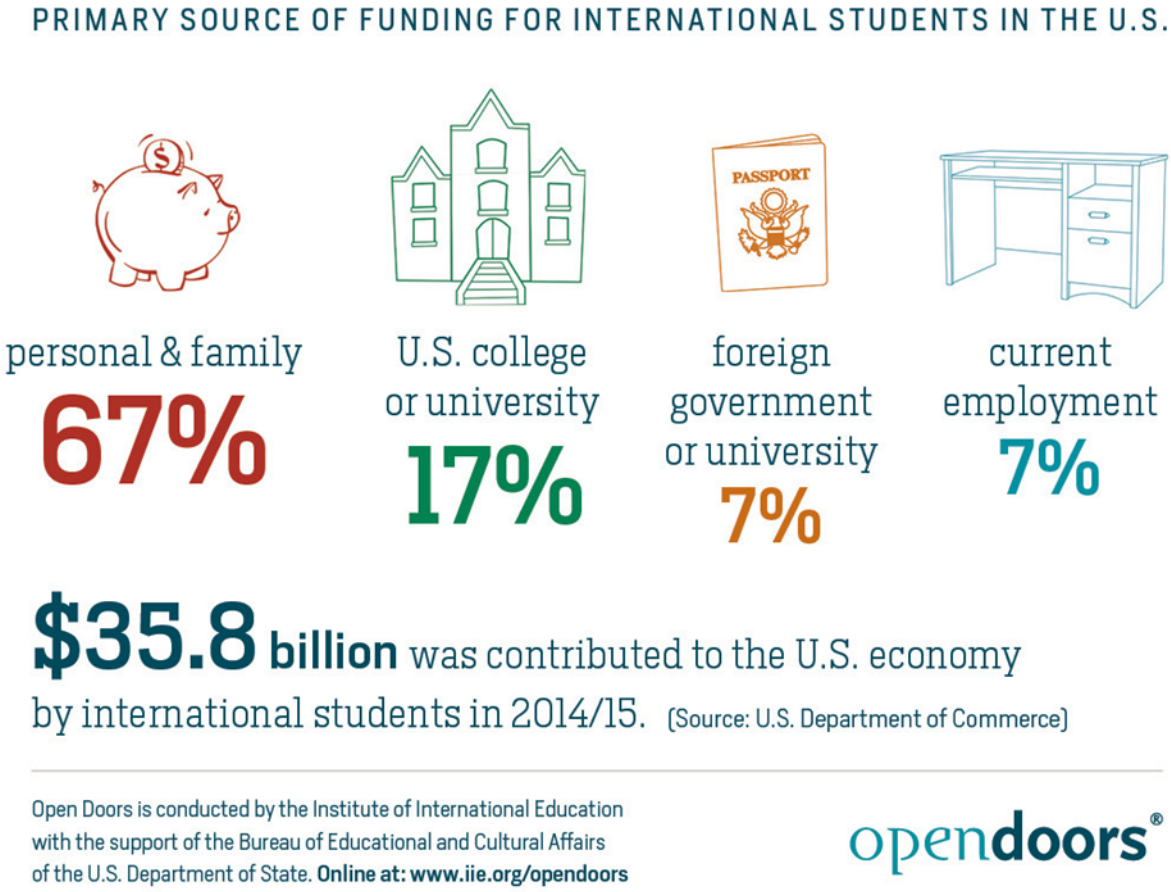

Figure 2: Primary Source of Funding for International Doctoral Students in the US and their contribution to American Economy.
Source: Institute of International Education Open Doors (2016).
https://www.iie.org/Research-and-Insights/Open-Doors/Fact-Sheets-and-Infographics/Infographics

Although a lot has been written in general about international students, very little has been written on doctoral students' learning of research in American universities. Research done in

the area has focused on understanding experiences and courses that help develop successful educational researchers (Leech & Haug, 2015). A PhD in the United States is done by taking research classes, passing a qualifying exam, writing and defending a dissertation. It is imperative to get an understanding of the way international students perceive their learning of research since they are coming from different countries with possibly different educational systems and cultures (Hegarty, 2014). In addition, there are reports that the United States is no longer the only country for international students as Canada and Australia are now offering alternative educational destinations to students from other countries (Hegarty, 2014).

This study will fill the gap in the literature of international doctoral students' learning of research. It may improve policy in the areas of recruitment of international doctoral students, research courses taught, teaching and supervising their research and mentoring.

Literature Review

Learning of Research in Research Courses

Doctoral students need to be prepared for research through enrolling in research courses to become knowledgeable in doing research (Leech, 2012). However, there are few universities that offer research courses at doctoral level in some programs because doctoral programs are designed on the assumption that students took research courses at the Masters Level (Leech & Haug, 2015). The findings from the study by Leech and Haug (2015) showed that most doctoral students completed their Master's degrees many years ago, and that may not be enough to prepare them for doctoral research. This puts international students in a difficult position because their learning of research at Master's level in their countries of origin may not be in tandem with learning of research in America. International students are trained in the same manner as all other doctoral students in the program to become excellent researchers who are well-versed in the accepted methods of collecting and analyzing data in their fields (Golde & Dore, 2001). Some universities do offer research courses at doctoral level.

International students are not generally accustomed to class practices in the United States and they must learn how to adapt to the teaching and learning styles (Kumi-Yeboah, 2014). International students are accustomed to a system of teacher-centered instruction and lecturing (Wu, et al., 2015). International graduate students, especially those from Africa and Asia find it difficult to participate in classroom discussions (Kumi-Yeboah, 2014).

Doctoral students in American universities are expected to work independently during their course of study in preparation of their future (Ren & Hagedorn, 2012). International doctoral students receive support from the universities' International Centers in terms of immigration laws and American culture. Most universities in the United States do not offer academic support services to doctoral students (Ren & Hagedorn, 2012). Most of the academic support is offered to undergraduate and Master's students. Some international graduate students form study groups with American students to learn from each other, and this proves helpful in their learning of research (Gebhard, 2012).

Given the centrality of research at doctoral level, what are the international doctoral students' research training experiences? The PhD is a research degree, and as such, the doctoral program emphasizes training in research, more often to the exclusion of other skills (Golde & Dore, 2001). Golde and Dore (2001) postulated that research training consumes the bulk of doctoral students' lives and is the one area of their preparation that seems successful. As part of research training, students share their research results and scholarship at conferences.

Although students have been encouraged to present at conferences, Golde and Dore (2001) argued that research training is not comprehensive. The reason is that students are not well-informed about all aspects of research, except for what is essential about writing a dissertation. Studies have shown that although publication is regarded as a critical component in the research process, students felt that they were not being prepared by their program to publish, and as such are not confident in their ability to do so (Golde & Gore, 2001).

The Role of Faculty

Faculty plays a crucial role in the international doctoral students' learning of research in different capacities as instructors, mentors and advisors (Kumi-Yeboah, 2014). In dealing with the international students it is important to get a glimpse of what the faculty thinks of international students. The way faculty sees international students in the doctoral program will help when evaluating their role and influence on international students. International graduate students in the United States, in general, are respectful of their advisors and faculty as compared to domestic students (Nguyen, 2013). But this respect, results in international doctoral students failing to come to departmental outings they are invited out of respect. If they were to come, they will come out of respect, and tend not to be free to express themselves for they tend to respect the hierarchy that exist between faculty and student (Nguyen, 2013).

In the United States, it is expected that students take the initiative to build meaningful relationships with faculty both inside and outside of class (Romerhausen, 2013). Another faculty view of international graduate students is that they consider them as hardworking and highly motivated as compared to domestic students (Nguyen, 2013). In that respect, international graduate students have a personal drive to succeed and in doing so, write papers and publish. However, it is the process of publishing that international students are found wanting. International graduate students come from different educational systems that consider everything accessible to them as being in the public domain and fail to acknowledge sources (Nguyen, 2013). In short, international students do not understand the concept of plagiarism in the United States. In this respect, international graduate students have needs, and these needs must to be addressed.

One strategy that helps international students succeed is mentoring. There are many definitions for mentoring; a mentor can be a faculty member, an academic advisor, a supervisor. Odena and Burgess (2015) found that supervisory feedback and mentorship tailored to the students' needs is helpful to international students who have different learning needs. Rose (2005) posited that the most important thing a mentor can provide is open communication and timely feedback. Research by Brill, Gogarty, Balcanoff, Turner and Land (2014) found that students felt that there was no good communication with their advisors and cited that unless students reach out to their advisors, they will not bother to reach out to students.

Academic mentoring is crucial for the success of a graduate international student and it involves emotional and psychological support, role modeling and career guidance (Ku, Lahman, Yeh, & Cheng, 2008). Sundli (2007) reported that mentors contribute to the development of their mentees through personal and professional collaboration. Mentoring is not limited to academics only, but may even include career and professional advice, social and emotional support, and role modeling (Davidson & Foster-Johnson, 2001; Kartje 1996).

International students should not only wait for supervisors' support, mentoring, or guidance, but must learn to become independent and plan their learning. Investing time in personal growth during the doctoral program is important as it gives international students a sense of

accomplishment (Odena & Burgess, 2015) especially in their writing experiences and general research. Personal organization includes time management and balance of social life with academic requirements. However, time management and personal organization varies from student to student and it is important for each student to find a balance that best works for them. Above all there is need to be resilient to be successful at such a demanding level of doctoral studies.

Publishing as a Doctoral Student

Academic writing at doctoral level is extremely important and is challenging especially for international students who are not English native speakers (Chou, 2011). Professors do play a critical role in this process through guiding and supporting international doctoral students (Cho, 2004). International doctoral students can learn from the professor through collaborating by co-publishing research articles (Brill, et al., 2014). For the student to benefit from the professor, it is important that both share a common interest in the topic (Brill, et al., 2014; Kumi-Yeboah, 2014). However, Campbell (2015) found that some professors fail to forge fruitful relationships with international students through failure to understand their situations. In such a scenario, international students may co-author and publish with American students (Campbell, 2015; Brill, et al., 2014).

International doctoral students who write papers for publication consult their local university writing center for corrections (Cho, 2004). In some cases, the students may ask a fellow student especially an American one to review their papers before they do send it for publication (Brill, et al., 2014). Even with all the extra support, international students are frustrated when they submit a manuscript for publication only to get feedback from reviewers asking them to get assistance with the English language (Cho, 2004).

Learning of Research Challenges

International doctoral students face many challenges in the learning of research. As already mentioned, international students coming from countries that have a different educational system than the United States have challenges to adapt academically. Gebhard (2012) found that international doctoral students were frustrated in class when they would raise their hands to contribute in discussions, but only find themselves ignored. International students reported that they need time to think and process their ideas, but they normally are not given the time (Gebhard, 2012).

Another challenge that international doctoral students face, is writing in the English language. Most researchers' writing on international students in general posit that students from other countries face challenges in expressing themselves in English (Brill, et al., 2014; Ku, et al., 2008; Nguyen, 2013). The writing skill is very important for completing a doctorate and failure to write clearly is a challenge for international students (Odena & Burgess, 2015). The immediate result of weak English language skills for doctoral students is that they take time to complete their tasks, and in some situations may not even have all the time to complete presentations in class (Telbis, Helgeson, & Kingsbury, 2014). Odena and Burgess (2015) came up with a generative model of writing development for international students that include tailored supervisors' feedback, resilience and organization, and support network for the successful completion of a doctorate.

The effects of weak English skills may extend beyond the classroom as students fail to socialize from their fellow American students (Gebhard, 2012; Telbis, et al., 2014). Some international students do not fail to socialize but refuse to socialize with American students because they

find it difficult and unnecessary considering that they are in the country for a short period (Hegarty, 2014). Failure to adapt to a new environment creates loneliness and homesickness that may result in anxiety and depression thus affecting the international students their academic outcomes (Banjong & Olson, 2016). These challenges will affect student-supervisor relationship in a negative way.

Other barrier that impacts negatively on international doctoral students' learning of research is the issue of finances. Most international doctoral students support themselves and with the desire to complete their degree, they end up working for many hours to raise money for living expenses (Kwadzo, 2014). The nature of their work may influence them in their learning of research because they end up working for many hours to raise more money thus depriving themselves with study time (Kwadzo, 2014). Telbis et al. (2014) found that international students suffer more financial stress which negatively affected their academic achievement.

Theoretical Framework

Competence, autonomy and relatedness are the three main factors in Self-Determination Theory (STD; Deci & Ryan, 1995), which distinguished between different types of motivation based on the different reasons or goals that give rise to an action. "The most basic distinction is between intrinsic motivation, which refers to doing something because it is inherently interesting and enjoyable, and extrinsic motivation, which refers to doing something because it relates to a separate outcome" (Ryan & Deci, 2000 p.54); the model is illustrated in Figure 3.

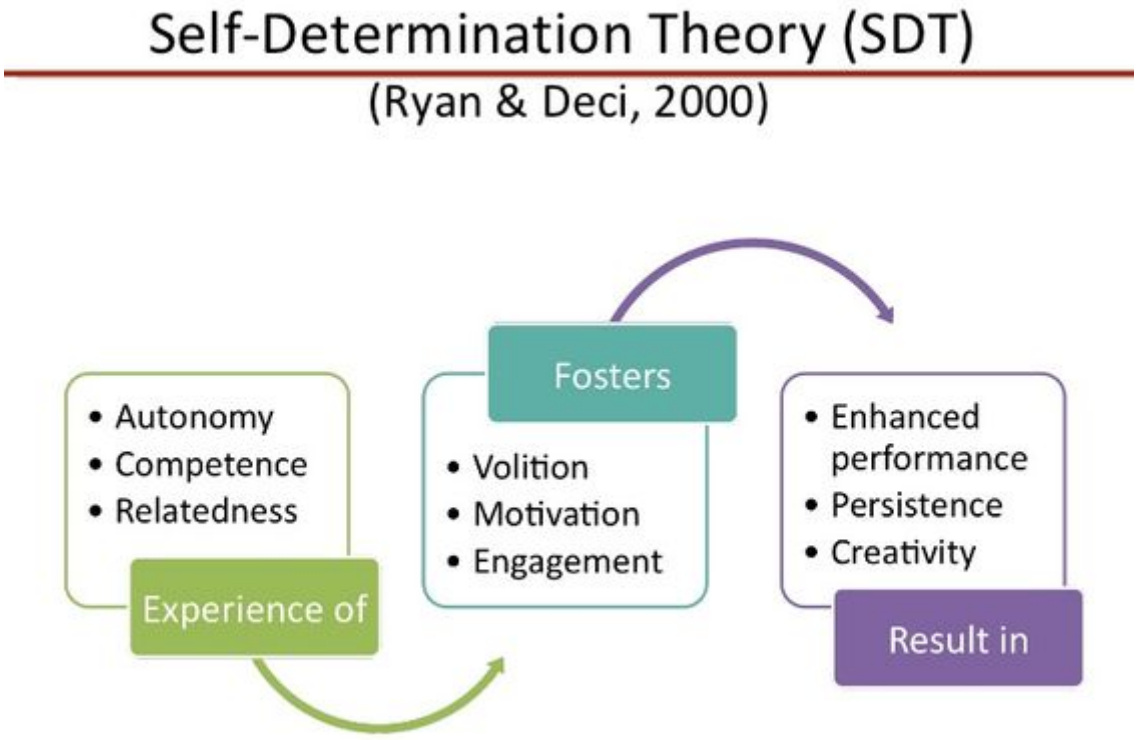

Figure 3: Self-Determination Theory (SDT). Ryan & Deci's, 2000 Theoretical Model. Source: https://i.pinimg.com/564x/2d/a5/e0/2da5e048d227b2198414cccaee20a159--self-determination-instructional-design.jpg

Methodology

The purpose of this basic interpretative qualitative study is to explore the learning of research experiences by international doctoral students who have completed research methods courses at a private faith-based university in South-Central Texas in the United States.

Research questions

The study was guided by the following research questions:

1) What are the perceptions of international graduate students on the learning of research at doctoral level?
2) How do international doctoral students make meaning of their learning of research?

Research design

The approach used for this study is basic interpretive qualitative research design to understand the meaning of doctoral students in the learning of research. By using basic interpretive qualitative research design, we sought to understand how doctoral students "interpret their experiences, construct their worlds [of learning research], and the meaning they attribute to the experiences" (Merriam & Tisdell, 2016 p.24).

The research design's purpose was not only limited to understanding how they make meaning of their learning, but also the exploration of the challenges international doctoral students face in the learning of research. Using basic interpretive qualitative research design in the methodology of this study, we aimed at documenting international doctoral students' perspectives and practices in their natural setting (Reeves, Kuper, & Hodges, 2008).

Setting and Participants

The participants' sample was composed of four (50%) males and four (50%) females. All the eight participants selected for the study were international doctoral students at a South-Central private faith-based Texas university in the United States. The selection of participants was based on purposeful sampling, specifically focusing on international doctoral students in Education programs. At the time of the research, all participants had completed a minimum of at least three research courses at doctoral level. Among the courses offered at the university were research methods and tools, qualitative research methods, social science statistics and advanced qualitative research design. The participants came from three continents: Africa, Asia and South America. They came to the United States on an F1 Visa [a student Visa given to a prospective student to enter the United States for the purposes of studying]. The participants willingly took part in the study. The settings of the interviews were research rooms at the library of the university the international students attend. We interviewed four participants each.

Although all the participants were adult learners, their ages varied from late twenties to late fifties. We chose not to identify the participants with respect to which country they came from and their stage in the doctoral program because doing so might provide leads to the identity of the participants. The nature of the study, purpose for the interview, IRB and Participant Consent form were sent via e-mail before data collection process. We explained confidentiality and possibility of withdrawing from the study at any time to the participants. For the purposes of privacy and anonymity, pseudonyms are used throughout this research paper.

Data Collection

For data collection, interviewing was used for this study to effectively gather, describe, interpret, and understand the learning and conducting of research by international doctoral students. The interviews were semi-structured and open-ended to allow student participants time and scope to express their opinions on their experiences and views on learning of research at doctoral level. Brenner (2006) describes semi-structured interviews as: "interviews in which the intent is to understand informants on their own terms and how they make meaning of their own lives, experiences and cognitive processes" (p. 367).

The length of the interviews varied from 45 minutes to 1 hour and ten minutes. We prepared a few interview questions and some of the questions were probing and follow up questions. The probing questions were to gather more information if we felt that we needed more relevant information than what the participants provided. We conducted all the interviews in the English language. All the interviews were audiotaped and transcribed.

We used Audacity software to listen to the audio files during the transcription process. We constructed the transcript using Microsoft Word. We first listened to the interviews to familiarize ourselves with and to get the general sense of the material (Creswell, 2012). We both transcribed verbatim, and always tried to make meaning from the conversations. We embarked in a strict transcription process where the words that are spoken, heard and recorded are written down by us as transcribers (Hammersley, 2010). Both of us as co-researchers decided not to share their transcripts with the interviewees because of time constraints.

Data Analysis

We used Spradley's (1979) domain analysis in analyzing our data for this study. Ratcliff (n.d.) defines domain analysis as the analysis of language of people in a cultural context. We used domain analysis because we were interested in understanding relationships among concepts (Leech & Onwuegbuzie, 2007) in the learning of research by international doctoral students. The first step in domain analysis we did was to analyze each sentence to identify emergent themes and categories across interviews from participants interviewed (Spradley, 1979). What this means is that we broke down complex sentences into shorter semantic relationships of meaning. Domain analysis involves the following process as conceptualized by Spradley (1979) and is illustrated in Figure 4.

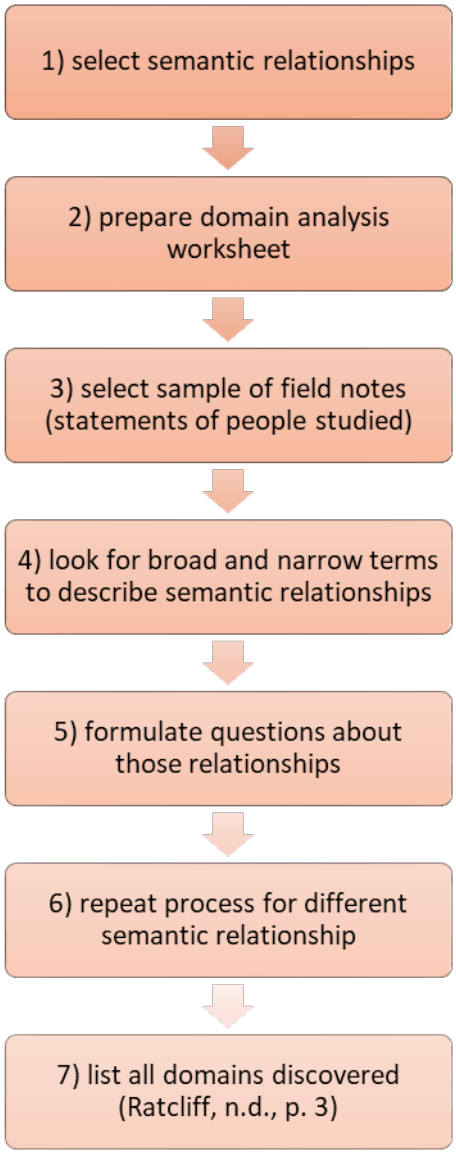

Figure 4: Domain Analysis as Conceptualized by Spradley (1979).

Findings

We analyzed transcripts and identified the following recurrent themes which explain the views and perceptions on how international doctoral students learn research: taking doctoral courses, collaborating with others, conducting individual work and research and using resources at the university.

Taking Doctoral Courses

International doctoral students said they value the courses that are offered in the doctoral program, especially those that are research oriented. They envision that the purpose of the doctoral courses is to help them write the final project, and that is the dissertation. The doctoral courses have helped them in the process of learning of research.

> This interview . . . is something which . . . was new to me. I learned it in class. I had talked to people before, but it wasn't like [a] formal semi-interview, so I learned to interview. I learned about IRB. I had heard about ethical, conducting

> research in an ethical manner, but I had not personally done IRB. So, to do that process was something I learned. So, I learned the process. – Richard

> In academic writing [course] I learned . . . how to research, how to write literature review, step by step research process from the introduction to the conclusion. I took this class to learn how to write research. – Charlene

Participants also stated that, through taking research courses, they learned to adapt to academic writing styles that are expected when you are a doctoral student. They also learned paper organization and APA style which the students admitted is a new phenomenon. The students valued the classes, but stated that learning of research is challenging yet interesting and eye-opening. Although the participants valued the research courses that are offered at the doctoral level, they stated that they were against other courses that were not research oriented. The students posit that these courses do not help them in any way, and they consider them as a waste of time and resources especially money.

> I think sometimes it [leaning of research] is boring and sometimes interesting and of course challenging . . .. You have to read many articles . . . but you are not getting what you are looking for. That is one of the frustrating things. – Peter

> I would really prefer that . . . we come in, we are taught on research, and then we do our research and we leave. That might help us . . . a lot in terms of cost, in terms of length and [other] resources. I fail to see the relationship between other classes which are not research classes and the research itself because the end product is the research. – Richard

The students also identified the role of professors in the learning of research as vital. They stated that professors helped them to learn through encouraging them to read extensively as individuals and work in groups. Apart from teaching them, the students said that the professors encouraged them to publish. Only one student stated that some professors told him not to bother about writing for publication, but to concentrate on finishing the PhD and move on.

> She [the professor] encouraged me to participate in class; she developed me, and took my research to the next level. The professor walked us through the process of writing for publications. The professor was very personal and helpful. – Charlene

> "Two or three of my professors have often said it's not . . . the best to target publication for your work. The best thing is have the PhD first, and then think of the publication. – Richard

Collaborating with Others

The students valued collaboration with others especially domestic students and professors in the learning of research and publishing of articles. As international students, participants said that working on group projects is of benefit to them as ideas are pulled together and this enables the students to finish a project in time. The students also felt that by working in pairs or groups, they learn from each other as different people bring in different ideas. Group work allows for division of responsibilities. International doctoral students stated that they have no problems in working in groups or collaborating with others and they help them learn doing research.

> The positive sides [of working in groups] are like we can divide the responsibilities in different parts, like someone can do literature review, another can plan to collect data, another one can help analyze data . . .. Ideas are pulled together and we cover a lot of ground faster; different people bring in different ideas. – Peter

> They [domestic students] will support my research, they tell me use this article, go this way. Americans help me [to] improve my English. – Charlene

Two students stated that, when they work with domestic students, they realize that they have an advantage over them in terms of language. The students stated that the domestic students are not patient with them when they take time to express themselves in groups.

> . . . this research in group doesn't help me, because I was working with American people. They were so smart; they were so sure. So, I do not learn in this project [because] they do not give you chance to contribute. – Charlene

> I think language is an area where they [domestic students] have an advantage. They have an advantage of studying using their own language whereas as an international student, this is my second language. I have problems in paraphrasing [and] is something very difficult, to find appropriate words that I want to say because the best words are already said in other articles. – Peter

Individual Work and Research

International students felt that group work sometimes suppressed their complete individual learning of research. In that respect, the students favored doing individual work and research. They stated that it is important for them to work individually so that they get a complete knowledge and grasp of whole research process. One participant stated that it is better to work individually rather than with domestic students because they want to personalize the whole process.

> . . . if you do it [research] by yourself, you are able to do the whole thing. You have the kind of complete experience of research. Whereas, [if] you do it in a group, though you are able to write, read the whole thing, but you are not gaining the experience doing the full research by yourself. – Peter

> Now this semester I started doing literature review by myself. I asked a teacher what a literature review was and another teacher for help, and I look on the internet and I wrote my own literature review. That's how I learned doing research.
> – Charlene

> When we work in groups with American students, they want to report individually saying 'I did this, and this person did that.' I would rather work alone [than] with American students. – Diana

Use of Resources

Many of the international doctoral students we interviewed reported the benefits of using resources to learn research. The students identified the graduate study rooms at the library reserved for graduate students as a vital resource that enables them to study without being interrupted. They even stated that they chose the study rooms for the interviews because they

were quiet places of individual and group study. One participant identified the doctoral dissertation room that is reserved for those students in the writing stage of their dissertations for use. Apart from the study rooms, international doctoral students also cited the graduate workshops that are held for their benefit. The students said that the library offers many resources that are geared towards improving their learning of research.

> I attended SAGE research workshop and asked help from librarian for doctoral students. I attended two conferences and the office of Graduate Studies was helpful with that [in attending]. – Diana

> Doctoral dissertation room is a nice place for us. I go in there and do my work quietly without disturbances. The library has good research facilities . . . like books, large database, [and] many computers. [In addition] . . . they hold workshops for our benefit. – Peter

Although some acknowledged the available resources for doctoral students that international students can access, one student said she was not aware of the existence of these resources. She pointed that the resources that were available were for undergraduates, and it would be "a shameless thing to attend undergraduate workshops." The student stated that if there are resources for doctoral students, then they are not being made known to students.

Discussion

The purpose of this basic interpretive qualitative study was to explore learning of research experiences for international doctoral students who have completed research methods courses at a private faith-based university in South-Central Texas in the United States. Our aim was to provide international doctoral students' perspectives on learning research through exploring their individual doctoral research experiences. Although the perceptions varied for each participant, this research shows similar experiences shared by all participants, as demonstrated in Table 1.

Table 1: Sample Domain Analysis Worksheet

Cantu & Gomba-Sample Domain Analysis Worksheet – First Interviewee				
Included terms	**Semantic Relationship**	Cover Term	**Semantic Relationship**	**Domain**
Completed all Research Courses	**It is a way To Learn**	Research Courses	**It is a way To Learn**	Research
History of research understood research terms Did a prospectus	**It is a way To Learn**	Research Methods	**It is a way To Learn**	Research
group project pair work	**It is a way To Learn**	Qualitative research classes	**It is a way To Learn**	Research
Has knowledge of research hands on experience	**It is a way To Learn**	since first degree (Masters)	**It is a way To Learn**	Research
group project pair work	**It is a way To Learn**	Qualitative research classes	**It is a way To Learn**	Research
ideas a pulled together cover a lot of ground faster different people bring in different ideas	**It is a way To Learn**	working with groups	**It is a way To Learn**	Research
interviewing process IRB Ethical considerations Process of doing the interview	**It is a way To Learn**	Qualitative Research Design	**It is a way To Learn**	Research
Published a literature review	**It is a way To Learn**	Publication	**It is a way To Learn**	Research

Helping doctoral students obtain the skills and knowledge required of them to be scholars may be the focal, integrative goal of pre-dissertation doctoral education. International doctoral students may be trained in research techniques through hands on experiences. Such preparation constitutes the foundation for choosing a relevant dissertation topic and mastering appropriate methods of data collection and analysis (Boote & Beile, 2005).

Although the students admitted to taking research courses at masters' level, they admitted that they did not even understand what they were doing. This is supported by Leech and Haug (2015) who found that doctoral students do not always have the research knowledge purported to have been acquired from their Master's program. In addition, students felt that the Master's program did not adequately prepare them for doctoral research. Thus, it should be emphasized that the goal of the PhD program is to prepare doctoral students to be the next generation of researchers (Gardner & Barnes, 2007).

At the heart of taking doctoral research courses, international doctoral students valued the work that their professors did to help them become competent scholars and researchers. Cho (2004) found that professors played a critical role in guiding and supporting international doctoral students in learning and doing research. The international doctoral students in this study consider professors as key to their success as they always challenge them to succeed through encouraging them to read and write for publication. The students cited professors as providing them with direction in a process that we might call mentoring. Mentoring is crucial to the success of doctoral students, whether domestic or international, as it results in high graduate success rate (Brill, et al., 2014).

Collaboration with others also emerged as a factor that influences international doctoral students in their learning of research. Students were divided on this issue with some citing it as beneficial while others felt the relationship with domestic students was not worthwhile. Some students stated that collaborating with a professor helped them to better learn the research process. Cho (2004) found that international doctoral students' role in collaborative work was of "administering a survey and analyzing the raw data" (p.65). The international doctoral students collaborated with professors in writing papers and publishing.

Collaboration with domestic students was not seen as beneficial by some of the international doctoral students. They cited language as an issue with their interaction with domestic students. Wu, et al. (2015) found that international students encountered problems in communicating with others in English as compared to writing. International students' work shows their linguistic limitations, and because they are aware of it they feel uncomfortable and powerless to contribute (Leki, 2001). The international doctoral students suffer from prejudice and discrimination and are marginalized in academic discussions as they make conclusions for them (Wu, et al., 2015).

The use of resources by international doctoral students that help them to adapt to American culture at a university is of utmost importance if students are to succeed (Wu, et al., 2015). Students are treated as equal in accessing resources at universities, but the way they access these resources put other students at an advantage in learning research (Cho, 2004). This study showed that few international students managed to identify resources available to them, while others did not even know the resources which they had access to. The argument provided by Cho (2004) is that the rate of access to academic resources might influence the way students learn and publish research papers. Wu, et al. (2015) found that international students used library resources as a strategy to adjust to American education system and learn research.

Conclusion

International doctoral students in the United States play a critical role in the economy, social life, unifying people and bring new experiences in higher education (IIE, 2014; Witherell & Clayton, 2014) yet very little is known on how they learn research (Wu, et al., 2015). This study may have policy implications in the recruitment, retention, and training of international doctoral students. By studying the international doctoral students' experiences in learning research, we uncovered valuable information in encouraging this underrepresented population to conduct interdisciplinary research, highlighted intercultural competencies and consciousness, while promoting globalization and internationalization in higher education in the United States.

Recommendations

Through the findings of this study, we aimed at setting high standards in the training of international doctoral students. It is recommended that more mentoring programs are done for international as well as domestic doctoral students (Brill, et al., 2014; Sundli, 2007). Mentoring programs enable the students to become aware of their capabilities and ready to do challenging tasks at doctoral level (Ku, et al., 2008). In learning research, it is recommended that professors and advisors should try to create a more inclusive classroom environment for international doctoral students considering that these students come from different cultures. Additionally, professors should be aware of the difficult acculturation process and language barriers the international doctoral students face.

Furthermore, faculty and advisors should ensure proper dissemination of information regarding resources such as research assistantships, library access to databases, workshops, conferences, writing centers, and tutors. Information is power and the international doctoral students feel powerless because they often do not receive this information.

There seems to be a lack of coordination between the office of international student services and the various academic and counseling services. To this effect the centralization of all the services for doctoral international students is suggested and to be directed by a "Dean of doctoral international students". It is recommended that further studies in international doctoral students' learning of research by be carried out.

Limitations

Our basic interpretive qualitative study was exploratory in nature. Although the participants were drawn from three continents, our findings may not be generalized to all international doctoral students in American universities due to the small sample of participants. We both came originally to the United States as international graduate students, and we engaged ourselves in reflexivity to limit bias, but we cannot completely rule out this bias towards favoring international students.

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"Youth Response to Religious Diversity and Religious Beliefs" A Study across College Students in the City of Chennai, Tamil Nadu

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Abstract

The Sociological study of religious diversity and youth is a growing field of research. Religious diversity, in the recent years, has been a central issue especially when there seems to be an increase in radicalization of religious belief. India has always been known for its pluralism and multicultural characteristics. This study is concerned with how the younger generation is responding to the challenges of increasing religious diversity. It goes on to explore the nature of belief and practice among young people who have a nominal or no religion identity. It examines the factors that impede religious tolerance among young people. The study allows serious thought into correct understanding of history and spreading awareness about misrepresented facts can help in promoting a secular society, especially among the youth.

Keywords: religion, diversity, tolerance

Introduction

"There is only one truth, only men describe it in different ways."
– Hindu Holy Book, Rig-Veda1:164:46

Clearly, the diversity of religions in the world has been a fact throughout entire history of all the world's major living religious traditions. This diversity has become the basis for contention. The tendency to display hostility toward different religious beliefs is connected to ethnocentrism. Because the tendency to be hostile to people who are different is so strong, it is an important religious problem. The world is experiencing growing religious diversity amidst rapid globalization. Religious diversity on one hand can create peace and harmony through mutual tolerance and understanding, on the other, it can pose challenges to social cohesion. Recent global events have shown religion can be misused to cause conflict. Religious diversity has been a central issue, especially after 9/11 where there has been an increase in the radicalization of religious beliefs related to the war on terror. Religious diversity and conflict have been topics of detailed study for the past several years and many research works are done in this field. Since 9/11 event, social scientists are striving to explain the role of religion and reintroduce the topic as a very important social variable.

Magnitude of the Problem

According to the Pew Research centre (an NGO tracking religious restriction and hostilities around the world since 2007) the overall global environment to religious faith is hostile. It states that four of five people around the world lack the freedom to worship. Some of its major findings are: the number of countries with religion related terrorist violence has doubled from 9% in 2007 to 20% in 2012. Women being harassed because of religious dress increased from 7% in 2007 to 32% in 2012. The Middle East and North Africa was the most common region for sectarian violence, half of all countries in the region experienced violence. The number of countries with a very high level of religious hostilities increased from 14 in 2011 to 20 in 2012. PEW records that where both, the government and society at large impose numerous limits on religious beliefs and practices, Myanmar, Egypt, Indonesia, Pakistan and Russia figure prominently. China leads in the category of government persecution and India tops the social antagonism list.

Religious Diversity and Conflict in India

India is characterised by more ethnic and religious groups than most other countries of the world. India is the second most populous country in the world, with over 1.3 billion people. India has more than 50% of its population below the age of 25. It has more than 2000 ethnic groups and every major religion is represented. Hinduism comprises of 79.80%, Islam 14.23%, Christianity 2.30% and Sikhism 1.72%. India, having a huge population, with a variety of religions is a breeding ground for communalism. The religious pluralism and the contradictions between the various religious faiths tend to create communal identities, which in turn develops to a stage of communalism, when passing through the democratic process.

The recent spate of religious conflict and social hostility has become a matter of serious concern. Incidents like the murder of rationalists and mob killings over beef-eating and cow slaughter rumours, honour killings, "*ghar wapsi*" (*home coming)* campaigns are disturbing social trends**.** The rising trend of communalism and the ensuing violence is a major threat posed towards the integrity of the nation. In this scenario, it becomes essential to develop new skills to deal with conflict, and create a community of mutli-religious appreciation. For this, understanding the present religious values of the youth becomes important. This study is an

attempt to examine the religious factors that contribute to social solidarity in the context of religious diversity, among the college students in the city of Chennai.

Historical Background

Historically, there is no convincing evidence for any religious conflict in the ancient or medieval period. Religious conflicts began to spring up only in the colonial and capitalist society and reached its height in the democratic society. India was never homogenous throughout the history and it was highly diverse. Several instances of cordial religious relations between the conqueror and the conquered are evidences to prove social harmony. It is believed that when Sivaji, a Hindu Maratha king, conquered Surat, he brought back the copy of the Holy Quran bearing it reverently on his head (Singh, 2003). But history is replete with examples of Hindus and Muslims destroyed their own place of worship. The Buddhist king of Harsha of Kashmira systematically demolished the Hindu temples and caused the idols to be dragged through the streets and lepers were made to spit and urinate over them. Similarly, a Hindu king cut down the Bodhi tree and constructed a Hindu temple. Aurangzeb destroyed a masjid when he attacked a ruler in Lahore. (Azgar Ali, 1995)

The relationship between major religions in India was not a matter of concern before the advent of British rule. According to Sudhir Kakar, in his book "Colors of Violence" states that before the late nineteenth century, overarching religious entities and identities such as Hindu and Muslim did not exist. Among the Hindus, there were sects who were frequently at odds with each other; nor did the Muslim constitute a monolithic Islamic collectivity. Romila Thapar (2000) writes that segmented identities existed in ancient India. The notion of community was not absent but there were multiple communities identified by locality, languages, caste, occupation and sect. What appears to have been absent was the notion of a uniform, religious community readily identified as Hindu. The first occurrence of the term "Hindu" is as a geographical nomenclature and this has its own significance. It is a common occurrence in the Arabic texts where the term is initially used neither for a religion nor for a culture. It refers to the inhabitants of the Indian subcontinent; the land across the Sindhu or Indus river. Al-Hind was therefore a geographical identity and the Hindus were all the people who lived on this land. Hindu thus essentially came to mean "the other" in the eyes of the new arrivals. Similarly the name 'Muslim" does not occur in the early records. The term used was either ethnic, Turuska, referring to the Turks, or geographical, yavana, or cultural mleccha. What is striking is that initially none of these terms had a religious connotation (Romila Thapar: 2000).

The precolonial and early colonial period conflicts between Hindus and Muslims were rare. Moreover, there was no need for religious gathering or collective bargaining under the banner of any community. It was the British who created such communities. Communalism and the consequent large-scale violence between the Hindus and Muslims began to spread in the late nineteenth century chiefly because of colonialism. The indoctrination of modernization in administration and educational fields resulted in basic structural changes in the society. To counter growing nationalism, the British followed the "Divide and Rule" policy. Rajiv Dhavan in his essay "The Road to Xanadu" states, the laws of British India entrenched identities, the policies of the Raj politicised them. As the movement to gain independence gathered ground it was more conducive to the British to give a political identity to various communities by promising them separate representation. This communal nomination to government councils continued till India was partitioned in 1947. Despite Gandhi's interventions, the Communal Award of 1932 was accepted as the basis for the government of India Act 1935 whereby separate electorates were guaranteed to Muslims, Europeans, Sikhs, Indian Christians and

Anglo-Indians. The politicisation of religious communities was thus complete. The politicisation of religious communities paved the way for new kinds of warring demands which often did not admit to consensus solutions or compromise. The reasons for religious gathering or collective bargaining under the banner of a community came into existence in the Indian society. Causes of religious conflict fundamentally are secular like competition for share in political power or government jobs, which was aptly created by the British to divide the people. Religion is not its fundamental cause but an instrumental cause because of its great mobilizing power (Azghar Ali, 1995).

Present Scenario

Major cause of religious conflict in India, in the recent times, is the demolition of Babri masjid. In December 1992, following the destruction of the mosque at Ayodya, rioting across the country left 1,200 people dead. The communal attacks that followed this incident are endless. In January 1993, Mumbai witnessed a nine day anti-Muslim program that left 600 people dead. The gruesome events in Gujarat that began with the Godhra train burning incident in 2002 and the carnage that followed for months are unimaginable violence that India had never witnessed. This tragedy was not due to religion but lust for power, in which religion was used as a tool. On 27 February 2002, a bogie was set ablaze killing 57 lives, comprised of *Kar sevaks (Hindu volunteers)* returning from a pilgrimage. Following the news of this tragic event, communal riots broke out against the Muslims and spread to 24 districts in Gujarat. Mobs comprising of 2,000–3,000 and sometimes increasing to 10,000, all armed with deadly weapons to kill were on the prowl on the streets of Gujarat. There were over 2,000 victims of violence and those killed were subjected to extreme torture. Women and children were special targets. These politically motivated and well planned riots have sent wrong messages to the people as religious conflict and hence have infused hatred towards other religion and their adherents. The events of March 2002 emerged from a long and deliberate construction of hate among the religious communities. According to Martha Nussbaum (2007) Hindu Muslim animosity (and also animosity against Christians) has long been fomented by the Hindu rights in many parts of India. The unprecedented violence that took place in Gujarat has made Indians anxious about what the future holds in store for the rest of the nation.

India is witnessing, as stated earlier violence and social hostility between religious communities on an increased scale. Resolutions previously made by enforcing laws and suppression have proved futile. Peaceful methods could only bring about lasting peace and harmony. To find a remedy for the mounting communal violence and its destructive after effects, a scientific approach is needed. Studying the factors that facilitate the development of tolerance/intolerance to dissenting religious beliefs will help to better understand beliefs of young people and the way this can be prevented.

Religion as a Sociological Concept

From the Latin *religio* (respect for what is sacred) and *religare* (to bind, in the sense of an obligation), the term religion describes various systems of belief and practices concerning what people determine to be sacred or spiritual (Fasching & deChant, 2001).In the wake of 19th century European industrialization and secularization, three social theorists attempted to examine the relationship between religion and society: Émile Durkheim, Max Weber, and Karl Marx. They are among the founding thinkers of modern sociology.

French sociologist Émile Durkheim (1858–1917) defined religion as a "unified system of beliefs and practices relative to sacred things" (1915). To him, sacred meant extraordinary –

something that inspired wonder and which seemed connected to the concept of "the divine." Durkheim argued that "religion happens" in society when there is a separation between the profane (ordinary life) and the sacred (1915). Durkheim is generally considered the first sociologist who analysed religion in terms of its societal impact. Above all, Durkheim believed that religion is about community: It binds people together (social cohesion), promotes behaviour consistency (social control), and offers strength for people during life's transitions and tragedies (meaning and purpose). By applying the methods of natural science to the study of society, he held that the source of religion and morality is the collective mind-set of society and that the cohesive bonds of social order result from common values in a society. He contended that these values need to be maintained to maintain social stability.

Whereas Durkheim saw religion as a source of social stability, German sociologist and political economist Max Weber (1864–1920) believed it was a precipitator of social change. He examined the effects of religion on economic activities and noticed that heavily Protestant societies – such as those in the Netherlands, England, Scotland, and Germany – were the most highly developed capitalist societies and that their most successful business leaders were Protestant. In his writing *The Protestant Work Ethic and the Spirit of Capitalism* (1905), he contends that the Protestant work ethic influenced the development of capitalism. Weber noted that certain kinds of Protestantism supported the pursuit of material gain by motivating believers to work hard, be successful, and not spend their profits on frivolous things. For Durkheim, religion was a force for cohesion that helped bind the members of society to the group, while Weber believed religion could be understood as something separate from society. Marx considered religion inseparable from the economy and the worker. Religion could not be understood apart from the capitalist society that perpetuated inequality. Despite their different views, these social theorists all believed in the centrality of religion to society.

Academic Context

In recent years, scholarly attention has been given to religion in the academy arena. Religion has become a central feature of politics and the debate about the appropriate role of religion in politics spurred broader discussion on the role of religion in public life. And the fact that college campuses are more likely to confront the issue of religious diversity has led to many scholarly inquiries. Many of the twentieth century studies on religion was heavily influenced by the theory that society would inevitably secularize or grow less religious as it modernized. Much to their surprise, a closer look at the contemporary role of religion on campus, found that religion appeared to be thriving on college campuses and student interest in religion and spirituality seemed quite high. Sociologist started focusing on the role played by religion during adolescents. These studies provided new information about religion among college students. Religion among the undergraduates has drawn the attention of sociologists of education and political sociologists. Though, scholarly attention to religious life on college campus has already produced important insight, it is also limited in some important ways. My study on youth response to religious diversity will contribute to our understanding of their interaction to divergent beliefs and practises and will also situate the agenda for future research.

Problem of the Study

Until recently, India has been remarkably successful in accommodating the cultural diversity through democratic institution. Religion has the potential to shape a national majority even though it is reflected by a multitude of cross cutting identities. Political appeals on the basis of religious identity and false propaganda against other religious belief and practices has begun to forge an increasingly self-conscious religious communities. This poses a fundamental

challenge to India as a secular state. It also instils fear and a sense of insecurity among the minority groups. This leads to imbalance and disrupts harmony in society. In such a scenario, laws are futile in its attempt to quell the endemic unrest and challenge of religious diversity and conflict. Religious understanding and appreciation are of utmost importance in a mutli-religious India. This development need to start from the youth. The youth have to be equipped with the ability to reflect on their own religious inclination and discuss these issues in a matured manner. To develop new skills to deal with dissension, increase tolerance and create a community of multi religious appreciation studying the present religious values of the youth is important. In this context it becomes imperative to examine the factors that facilitate the development of tolerance and intolerance among the youth of different faith. It will help to understand the religious mechanisms which affect young people. A study among young people is very relevant as this is the age where they rely much on peer group, leading to the creation of In-group and Out-group associations. Examining the factors that impede religious tolerance among young people will help to build a harmonious society. Moreover as an educator myself, I strongly assert that transformation can be brought through educating the youth on religious equity for peaceful coexistence. Hence a study of this nature becomes crucial.

Research Questions

1. What is the role of religion in promoting cohesion in a religiously diverse society?
2. Does religiosity play a role in drawing In-group and Out-group boundaries that have implications for religious tolerance?

Objectives of the Study

1. To find out the religious factors that promotes tolerance among the Hindus, Muslims and Christian youth of Chennai City.
2. To examine the causes that impedes tolerance among the young people.

Hypothesis

1. Religious persons are likely to be more tolerant than non-religious persons.
2. There is no significant difference between men and women in terms of religious tolerance/intolerance.

Methodology

Research Design

Keeping the objectives of the study in view and the issues mentioned at the outset, an appropriate logic of enquiry is applied. The study is descriptive in nature; it attempts to delve into the religious factors that promote social cohesion and dissent among the religiously diverse college students of Chennai city in Tamil Nadu. Through the adoption of inductive strategy the researcher will collect data related to the concepts and it will produce limited generalization. The study will be conducted in three prestigious Christian colleges of Chennai city, Tamilnadu, India. Random sample survey will be utilised, as it depends on the permission and availability of the students. As it is a very sensitive area, not many institutions are forthcoming in involving their students in this survey.

Sources of Data

It is empirical and analytical in nature and the analysis of the study is based on primary data.

Tools of Data Collection

Primary data was collected using Focus Group Discussion and Sample Survey using semi-structured questionnaire developed for this study by the Investigator.

Analysis

If social solidarity has to be developed in times of communal disharmony, there needs to be an attempt to understand the attitudes of the youth towards religious beliefs and practices as they are useful indicators of the present scenario and also for the future trajectory of social cohesion. The goal of my research is to understand the religiously diverse student community and their responses to different belief and practises, as religious diversity has appeared to prompt religious intolerance in India in recent times.

The data for this article were collected through two principal means – focus group discussions and questionnaire survey. Three focus group discussions were held lasting for three hours. It is understood that a sample of 25 people is not in any way representative, but the strength of this discussion also lays in the fact that same set of open and closed ended questions were asked to respondents who were part of the questionnaire survey. Therefore this could be seen as a comparative tool. The questionnaire survey produced data from a group of 100 young people, in the age group 17-20 years. It had an equal representation of males and females.

Table 1: Religious Belief of the Students

Religion	%
Hindus	27
Muslims	5
Christians	51
Non-Believers	17
Total	100

The data presented in Table 1 pertaining to religious diversity among the respondents in the study reveal that Christians constitute the highest number with 51%, followed by Hindus with 27% and Muslims with 5% of the total sample. It is also interesting to note that 17% of the respondents have identified themselves as non-believers. The fact that Christians constitute the highest percentage could be attributed to the background of the institutions that the respondents are part of the sample for the study has been drawn from a population of students attending different Christian minority institutions in Chennai, India.

Table 2: Gender-Wise Distribution of Respondents' Religious Affiliation

Religion	Males %	Females %
Hindus	28	26
Muslims	2	8
Christians	56	46
Non-Believers	14	20
Total	100	100

Table 2 presents a closer view of the respondents' affiliation to mainstream religions on the basis of gender.

Among the male respondents, Christians constitute the highest percentage - 56 %. As stated earlier, this could be due to the background of the institutions to which the respondents in the study belong. Hindus constitute 28% of the total sample, followed by Muslims at 2%. 14% of the male respondents chose the category of non-believers.

Among the female respondents in the study, Christians constitute 46%, Hindus 26%, Muslims 8% and non-believers 20%.

A comparison of the data on gender-wise religious affiliation of the respondents shows that non-believers are more in number among females at 20% of the total sample as against 14% of the total sample among the male respondents. This finding is particularly interesting in the context of Chennai which is largely regarded as a conservative city, and therefore demands further probe.

Table 3: Gender-Wise Distribution of Students Who Strictly Follow Their Religious Tenets

Religion	Males %	Females %
Hindus	22	18
Muslims	2	8
Christians	38	28
Total	62	44

The data presented in Table 3 reveals that 62% of the male respondents in the study follow their religious principles to the core. The majority of the male respondents can therefore be viewed as religio-centric as they consider the observation of religious tenets as important.

Table 4: Gender-Wise Distribution of Students Who Are Religio-Relative

Religion	Males %	Females %
Hindus	6	8
Muslims	0	0
Christians	18	18
Non-believers	14	20
Total	38	46

Table 4 shows that 38% of the male respondents have expressed a lack of strict adherence to their religious tenets, stating that they belong to a religion as a result of societal and family expectations from them to do so, and that personally, they do not follow religious practices strictly.

Among the female respondents, 44% are religio-centric while 46% are not so concerned about following religious tenets strictly.

A comparison of the above data shows male respondents to be more religious as compared to female respondents. This could be due to the influence of higher education, exposure to different ideas and peer influence.

Table 5: Gender-Wise Distribution of Respondents Whose Life Decisions Are Influenced By Religious Beliefs

Religion	Males %	Females %
Hindus	26	20
Muslims	2	6
Christians	44	40
Total	72	66

Among the male respondents, as the data in Table 5 reveals, 72% have admitted that their life decisions are influenced by their religious beliefs. This percentage is higher than the number of male respondents who identify themselves as religio-centric (62%). This could be due to the fact that even if they do not follow religious tenets, due to the socialization process, they end up placing a premium on religious beliefs while making important life decisions.

Among the female respondents in the study, 66% admitted that they base their decisions on faith. Majority of the female Christian respondents have admitted to the importance of religion in decision-making processes.

Table 6: Gender-Wise Distribution of Respondents Who Are Less Conscious of Their Religious Beliefs While Making Life Decisions

Religion	Males %	Females %
Hindus	2	6
Muslims	0	2
Christians	12	6
Non-believers	14	20
Total	28	34

The data presented in Table 6 reveal that 28% of the male respondents in the study do not base their decisions on faith. They believe that life chances are opportunities that should not be missed for religion's sake.

Among the female respondents, 34% of them do not base their decisions on their religion beliefs.

Interestingly, while 2% of the female Muslim respondents have stated that religion is not an important factor in taking decisions, the number of male respondents from the same community who hold a similar view stands at zero.

Table 7:Gender-Wise Distribution of Respondents Who Are Not Willing To Adopt Other Religious Values

Religion	Males %	Females %
Hindus	12	14
Muslims	2	8
Christians	34	20
Total	48	42

Data from Table 7 reveals that 48% of the male respondents in the study are reluctant to adopt values from other religions. This conveys a sense of intolerance, as the respondents are rigid with respect to their belief in total commitment to their own religion.

Among the female respondents, 42% are unwilling to adopt values that are not from their religion. 20% percent of the Christians, 14% of the Hindus and 8% of the Muslim respondents have reported to being committed to their own religion.

Table 8: Gender-Wise Distribution of Respondents Who Agreed to Adopt Other Religious Values

Religion	Males %	Females %
Hindus	16	12
Muslims	0	0
Christians	22	26
Non-believers	14	20
Total	52	58

Among the male respondents, the majority of the students, that is, 52% have exhibited a secular attitude by stating that it is good to follow values that are for the good of the individual and society irrespective of which religion they emanate from.

As the data presented in Table 8 reveal, the number of females who are willing to adopt values of other religions if they are for the good of the individual and society (58%) is more than that of males willing to do so.

Table 9: Gender -Wise Distribution of Respondents Who Agreed That Well-Being of Society Depends on Being Tolerant Towards Others

Religion	Males %	Females %
Hindus	24	24
Muslims	2	6
Christians	46	42
Non-believers	12	16
Total	84	88

The data presented in Table 9 shows that a large of majority of the respondents - 84% of the male respondents and 88% of the female respondents - agreed that it is their responsibility to breed a tolerant society whose well-being lies in their actions.

Table 10: Gender-Wise Distribution of Respondents Who Disagreed That Well-Being of Society Depends on Being Tolerant Towards Others

Religion	Males %	Females %
Hindus	4	2
Muslims	0	2
Christians	10	4
Non-believers	2	4
Total	16	12

Only a small percentage of the respondents – 16% for males and 12% for females - disagreed, holding that their attitude has no role to play in bringing about a tolerant society and that the responsibility lies with others. 4% of the non-believers, who are generally viewed as secular people, also held a similar view.

Table 11: Gender-Wise Distribution of Respondents Who Expressed Tolerant Attitude

Religion	Males %	Females %
Hindus	24	16
Muslims	2	6
Christians	36	30
Non-believers	10	12
Total	72	64

Table 12: Gender-Wise Distribution of Respondents Who Expressed Intolerant Attitude

Religion	Males %	Females %
Hindus	4	10
Muslims	0	2
Christians	20	16
Non-believers	4	8
Total	28	36

72% of the male respondents were willing to place themselves in the position of others, thus demonstrating a tolerant attitude, while the remaining 28% expressed their unwillingness to do so.

Among the female respondents in the study, 64% demonstrated tolerance by expressing their willingness to place themselves in the position of others. The remaining 36% demonstrated intolerance in this regard.

A comparison of the data suggests that the male respondents in the study demonstrated a greater degree of tolerance as compared to the female respondents.

Interpretation of focus Group Discussion

Participants of the focus group discussions were asked a series of questions about their views of their own religion. They were also asked to comment on other religious group's beliefs and practices. Questions concerning the amount of contact they had with other members of religious and ethnic groups were also asked. The results reveal that the youth are highly appreciative and willing to engage with other members of religious groups. Hindus, Christians and Muslims seemed to have an Inclusivists' attitude. Muslim respondents expressed even greater homogeneity of religious attitudes and willingness to work with other faith group despite strict adherence to their religious tenets.

The following comment from the focus group discussion conveys the perception of one religious group on another:

> "I like the charitable spirit of the Christian community. When the recent floods hit city of Chennai, whenever there is a natural disaster they are out always

> volunteering and showing their concern for the needy. I like their spirit of willingness to give and share, particularly during Christmas time". (Female, Hindu 18 years)
>
> "Muslims have lots of things that can contribute to my faith. One thing is their commitment to prayer…I'm always astonished at their commitment to pray five times a day and their strict fasting during Ramzan". (Male, Christian 18 years)
>
> "Hinduism has so much to offer through their fables and epics. Am always fascinated as to how there is a myth behind everything". (Female, Christian 18 years)

Through the focus group discussions students' perception on communal violence could well be understood. Majority of them are of opinion that conflict and violence in society takes place not due to religious reasons, but political interests and politicians are in the foreground for display of such heinous acts in society. Even though they expressed conversion, some bizarre rituals, disruption of traffic for religious rituals sake are irritable aspects of religion; they do not lead to intolerance and hatred towards other religion. Religion they believe is personal and should be dealt at that level. Generally, they are of the opinion that India is a secular nation and by and large its citizens are tolerant and secular. It is politician and caste groups for economic and political benefits who instigate and make a situation volatile. Conflict is provoked in society using religion as a means. Today, communal identity is gaining importance in society for economic and political benefits and not because of one's religious commitment. To borrow from M.N. Srinivas' famous term "vote banks, today for politicians they emerge by developing communal identity.

This is corroborated with the survey findings on empirical questions on whether they would consider a religious value that is not flowing from their religion as worthless. 52% males and 58% females stated that they would accept other religious value. On the question of whether they place themselves in the shoes of another person of different religious belief 72% of males and 64% females were in agreement with it. These responses should not mislead the reader that the respondents are secular, as 62% males and 54 % females affirmed following their religious tenets strictly. A section of the youth did not want to mention their religion as they felt they are agnostic or spiritual. Non-believers among males comprise of 14% and among females 20%. Nevertheless, when it comes to being conscious of their affiliation and decision making 72% of the males and 66% females stated that they are guided by religious values. Majority of males, 84% and females 88% agreed that well-being of society and individual depends on their tolerance towards other religion and beliefs. There was total agreement to the question on socializing and celebrating festivals with other individuals of different faith.

To the question on differed opinion of another religious practice and belief, they were varied responses. Students expressed that religious communities should avoid proselytizing, as religion is a private issue. Processions, religious songs over the public address system, disrupting traffic for death ceremonies, bizarre rituals is where they felt they had to be tolerant despite their dissent to such practices. Students also expressed the need to be sensitive to other people's belief and not insult or disrespect other religious expression in public. Majority of the youth acknowledged the right of everyone to practice their own religion. Though 50% of the sample surveyed believed their religion is true. This cannot be interpreted as an exclusivist view, as exclusivism is characterised by an unwillingness to enter into religious dialogue with followers of other religious traditions. Here, the respondents are prepared to work together with

adherents to other religions, but do not feel the need to enter into exchange about matters of religious truth or salvation, as they already feel they are in possession of truth, hence could be referred as traditional inclusivists. Deeper analysis is required to confirm the other half into religious pluralist group.

On the whole the youth expressed that they have not experienced discrimination based on their religious background. Most of the youth mentioned that reservation based on religion should be avoided and only merit must be considered. Politicians are perceived as source of religious conflict since often they use religion for political interest. According to the youth, their families were also supportive of multi-religious friendships, but not so supportive of close intimate relationships (marriage). Majority of participants thought that religion and customs were important for the selection of intimate partners and would not marry a person from another religion. Discussions with students made it apparent that they do hold prejudice and stereotypes which determines the level of interaction they will have with other members. This could be due to continuous information about hate messages and events that is reported in the media, which leads to formation of dissent towards other religions and formation of In-group/Out-group attitude.

Conclusion

The study reveals that religion is an important part of youth life. The youth see religion as a personal issue and respecting one another is the key to social cohesion and harmony. Any form of disruption and intrusion into their life is resented. There is no significant difference between believers and non-believers in terms of their tolerance. In fact, non-believers have also expressed intolerance by expressing an intolerant attitude, by placing the responsibility on others for the well-being of the society. The hypothesis that there is no significant difference between men and women in terms of religious toleration is accepted. In fact, a closer look at the data reveals female respondents seem to have scored more on the secular aspects. Rigidity over religious matters seems less in comparison to the male respondents. Over, all the youth seem to be appreciative of one another belief and practices. It is also that the young generation, being part of the globalization processes and information revolution will have all the opportunities to see their unity and not their divide. Data analysis shows that the youth exhibit characteristics of strict adherence to their faith and also willingness to be part of community activities. This behaviour could be encouraged and channelled to help the deserted, abandoned elderly and deprived in the society. Attempts must be made to build and strengthen these youth communities within religious groups and then encourage members of different religion to partake in joint ventures. This might result in successful inter faith partnerships and in due course of time, long established prejudices and stereotypes can be eliminated. As the students opined religion is deliberately used as a tool for attaining political gains. Now, the quest is to deal with differences emanating from diverse groups in society. The answer lies in strengthening secularism. In India, the concept of secularism goes beyond toleration to guarantee equality and freedom of religion; and to deny the appropriation of state and society by any one particular faith. The three important components of secularism in India are religious freedom; celebratory neutrality and reformatory justice. India's secular state was designed to celebrate all faiths and also enjoined to eliminate some especially invidious practices sanctioned by the religion in question (Rajiv Dhavan:, 1999).

In today's world all societies have to be secular and a diverse nation like India have to be more secular. (Azhagar, 2002) The fact in India an overwhelming majority of people are religious but tolerant and respect other religions are thus 'secular' in the Indian context. The real spirit

of secularism in India is inclusiveness, religious pluralism and peaceful co-existence. It is politics which proved to be divisive and not religion. As Romila : 2000 states, "if we can read our history with more sensitivity and insight, it would contribute to avoiding a fascist future". Moreover many biases are spread through partial recount of past events. Communal (mis)interpretation of history has become a weapon in the hands of malice seeking groups. As pointed by Ram Puniyani (2003) the ridiculous claim that Christianity is nothing but Krishna Nitii and that Taj Mahal is a distortion of the word Tejo Mahalaya, meaning Siva Temple are intended distortions of historical facts. Chausalkar (1995) observes "The communists used the history as the opium of the people. They build up illusions of the great past". Avenging for the past in the present is a wrong way of perceiving of the society. A correct understanding of history and spreading awareness about misrepresented facts can help in promoting a secular society, especially among the youth. The heartening factor is that India is still secular and the youth are sensitive to their brethren could be seen in the aftermath of Godhra violence. Dozens of young people, students and young scholars and activists converged in Gujarat. A political science student from Jawaharlal Nehru University in Delhi said that it was very important to Hindu students to go there and do work, as a type of penance for a collective Hindu guilt: she and others thought in terms of the Hindu concepts of prayaschit or atonement (Martha C.Nussbaum, 2007). Many Delhi University students also volunteered to help in various relief camps.

It is clear that secularism is very much valued in Indian society. Nevertheless, as religion is a complex phenomenon, often interrelated to ethnic, social, political, cultural and historical traditions, to have a deeper understanding of the youth attitude towards their religion and other belief systems, it is important to tackle the complex issues that lie within religious identity. Research needs to be conducted on the role of social, economic, and language on college student's religiosity. Moreover, noticeable number of students has expressed to be non-believers this lends itself for future important research to be done on how college affects student religiosity? Does it mean students disengage from religion on entering college or is it being transformed through their exposure to education and pluralistic setting? These can be the goal for future study. These are global issues which are complex in nature and require constant reviews. My motive to select this topic is to stimulate debate and move these relevant issues in search of constructive responses for social solidarity.

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Symbolic Perception Transformation and Interpretation: The Role and Its Impact on Social Narratives and Social Behaviours

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Abstract

The primary purpose of this investigation is to inform how indigenous symbols are incorporated into meaning making of social narratives, and the impact of misappropriation, misuse and misinterpretation of symbols with their original intentions. Literatures discussing the process of symbolism perception transformation capacities are reviewed, to present relevant theories and review the consequences of wrongful usage, to understand the unconscious effects of symbols on social construction of behaviours. Perspectives about meaning-making processes and symbolic perception transformation provide insights about the dynamics of symbols' usage for individuals and groups in contemporary society and the impact of conscious and subconscious appropriation in the context of social behaviours. To seek in-depth understanding of the subject, qualitative methodology was applied for this study through interviews with Malaysian educators to uncover the nature and extent of symbolism's influences on societal behaviours. Interviews revealed issues relating the role of symbols' interpretative difficulties to cultural and social narratives, and in the appropriation of significant signs for psychological impact, aesthetic value, and propaganda purposes. Findings suggest the capabilities of symbols to unite and inform about the origins of humankind have weakened, in terms of their representational roles in the evolution of cultures, and their capacity to invoke social identity and change. In conclusion, recommendations are given on ways to enhance the perception transformation through the educator's role in creating accurate symbolism perception, interpretation and universal standards.

Keywords: symbol, meaning making, social construction, narrative, perception transformation

Introduction

Since Guy Debord's 1967 treatise on its historical uses as cultural material to signify ideas, beliefs, actions, events or physical entities, symbols have been instrumental for human communication and commodification in our "society of the spectacle". The study of symbols seeks to understand symbolic forms of mediation and the mediated, and aims to critically demonstrate symbolic construction in its cultural role as meaning-makers in postmodern era (Hall, 1996, pp. 163–170). Works and research by eminent structuralists, semioticians, linguists and artists recognise the heterogeneity, universality and commonality of ideas and concepts behind symbols, in their service as "metaphorical texts of social transformation, cultural change [and of various] scenarios and possibilities" (Hall, 1996, p. 286).

Symbolic complexities derive from configurations of meanings and values, socially and culturally. Indigenous symbols represent sacrosanct meanings but the construction of behaviours, emotions and values based on universal characteristics of symbols among different groups in society, has been a longstanding problem. In the process of social change, symbolic perception transformation refers to the removal of symbols' original context, overthrowing old social hierarchies, imbuing fresh interpretations, resulting in dilution of inherited meanings, further rending global and indigenous communities apart.

Objectives of Research

In this study, perception transformation of symbols, their social roles and impact will be discussed, to consider their importance in the social construction of narratives. The research seeks to understand whether significant exposure, encounters, usage and mediation of symbols in human interactions affect the rate of symbolism's perception transformation, resulting in unconscious consumption of misappropriated icons, incomplete information, inaccurate knowledge and indiscriminate misinterpretation. The loss of symbolic significance is extrapolated in further analysing why social organisations such as brand communities continue to repurpose symbols and icons for strategic purposes. The transformation of indigenous symbols' perceptions in modern narratives, and the effects of transformation on societal behaviours, will be explored.

This paper seeks to enjoin theoretical perspectives from the arts, media culture, social constructionism theories and anthropological science to authenticate the meanings of symbols for intended audiences. This investigation contributes to research through discourse insights from arts and anthropology scholars' perspectives. By examining how symbols are incorporated into the meaning-making schemas of social narratives, this paper raises the issue of misappropriation and misinterpretation of symbolisms as an implicit perception transformation from original symbolic function for intended (aboriginal) audiences. Critical analysis for this paper is underpinned by the question: How could authentic meaning be restored to symbols that are transformed and inaccurately perceived?

Literature Review

Julien (2012, p2) in *The Mammoth Book of Lost Symbols* states that symbols, along with myths, folktales and legends, were the original means of communication, from the early stages of civilisation when visual metaphorising and allegories prevailed. For indigenous peoples, symbols represented abstract concepts, phenomena, ideas and emotions. Symbolisms are still pervasive in modern times, even though perception processes have shifted from earlier epochs. Abstraction of symbolic meanings has become a vague undertaking for the average person

today. This happens because original primitive peoples used to think "by way of analogy", which does not seem rational to modern individuals (Julien, 2012, p.2). Symbols are misunderstood and misperceived a lot of times due to personal interpretive modes that guide our judgment, that eschew consideration for the thousands of years of social evolution that have shaped our collective minds. Accordingly, symbols are as antiquated as they are powerful (Julien, 2012, p.3).

Symbolism in Theory: Anthropological Perspectives

The notion of symbolic arbitrariness makes symbolic signs a creative force to be reckoned with, with folklore and mythical inspiration embedded into everyday discourses, creative inspiration and material narratives (Bruce-Mitford, 2008), but as semiotician Charles Peirce points out, successful semiosis (meaning making) derives referentially by association to the interpreter's own culture, environment and backgrounds (Innis, cited in Valsiner, 2012, p. 260). This *semiosphere* (Lotman, cited in Valsiner, 2012, p. 260) characterises the subconscious interpretations of symbols and their classification into archetypes based on social encoding in individuals' upbringing as well as personalities, attitudes, reactions and habits. Consequently, the cultural interpretation of symbols, or ethnographic observation of tangible, behavioural outcomes involves structuration of language (both written and oral traditions), mythical conceptualisation, visual resources and other aspects of encoded or inscribed information that survives (Bodley, 2011, p. 18). Anthropological discussions of symbolisms mainly seek to understand the influence of symbolic construction on people's perception of their living environment and behavioural outcomes, rather than what it meant to people of the past (Wilkinson, 2009). Cultural theorist Stuart Hall (1996, pp. 157–158) argues that reductionist approaches to interpret cultural objects and textual inscriptions are unfeasible, since the complexities of social construction and mediated forms of articulation produce symbolic contradistinctions and struggles in their evolutionary quest for survival.

Appraising the rules of linguistic codes forms the study of semiotics or meaning-making. The use of signs, imageries and symbols is presumed to be the observable by-products and expressions of one's culture and linguistic faculty, as there are "no pre-existing ideas" in the mind before language (Narey, 2009). Mastery of these codes or "modalities" enables analogous intertextual connections to understand and communicate through signs and images; or to find significant cultural meaning in signs and images which surrounds and connects them (Jewitt & Oyama, 2001, pp. 134–156). However, social semiotics that allows the same language to be understood and expressed is a problematic approach since symbols contain denotative and connotative meanings with diverse psychological, religious, historical, socio-political and moral contexts (Julien, 2012).

Perception and Interpretation of Symbols in Design

In studies of historical symbolism, the "other", exotic or indigenous cultures embody sensibilities towards objects and signs which advanced cultures may deem irrational, inferior, and distinctly pre-modern (Morley & Robins, 1995). Conversely, iconic representations may adapt layers of implicit and explicit meanings, diluting its symbolic authenticity, creating contentions and confusions about their purposes and meanings for intended groups, unless universal consistency and recognisable standards of motif, style and forms are applied (Lidwell, Holden & Butler, 2003). Designers' interpretive analyses of cultural symbolism, as Steven Heller (2004, pp. 323–5) explains, range from the study of semiotics (function of signs) to *semantics* (meaning of signs), *syntactics* (visual representation) and *pragmatics* (effect of signs on recipients). Although many traditional symbolic environments, family, community, tribes, have evolved and devolved due to global transformation of socioeconomic systems of

production, distribution and consumption, the cultural representations which express symbolic power and resources of specific cultures have not materially progressed. Symbols, according to human-centred design researcher Dr Goncu Berk (2013, p.14), are viewed differently now than how they were created for and interpreted by indigenous societies. Unfortunately, society is still being served imageries that imply isolation and fragmentation of individuals and groups into "lonely crowds" as acceptable realities, although in design research, some practitioners propound the use of cultural *perceptual filters* in working through problems (Goncu Berk, 2013, pp. 186–223).

Essentially, the premise of interpretive requirement is similarity of judgement towards symbols. However, today's large amount of accessible information, widespread commercialisation and consumerism widens our perceptual sense-making towards the same symbol. Jonathan Rey Lee (in Weiss, Propen & Reid, 2014, p. 99) discusses LEGO® plastic construction blocks as a metaphor of the symbolic power of designed mediums, and its ability to disrupt "subject-object relationships": creativity in artificial form becomes a self-centred, privileged act of indulgence, reshaping human dominance over the natural environment (in contrast to indigenous dependence on environmental realities), catalysing consumer culture and trends into a universal reality. While the principle of iconic representation is predominant in the fields of arts, sociology and humanities, research in architectural and built spaces acknowledge that symbolic expressions are difficult to signify (Davis and de Duren, 2011). Consequently, accurate perception of symbolic architectural constructions such as buildings, must reside in meaningful discussions about intentional spatial imageries (Sklair, cited in Davis and de Duren, 2011, pp. 182–183).

Cognitive and Social Influences on Symbolic Perception

Symbols as vital sociological communication forms representing religion and beliefs (Figure 1), are powerful embodiments of cultural traditions and heritage, concepts crucial in preserving social harmony (Tresidder, 2000). Swiss psychotherapist Carl Gustav Jung believed symbolism to be a crucial marker of individuals' personality and self-identity, founded on one's psychological subconscious and the collective unconscious, and the process of decoding their meanings in dreams and imageries associated with heroes, myths and archetypes produces awareness (Julien, 2012).

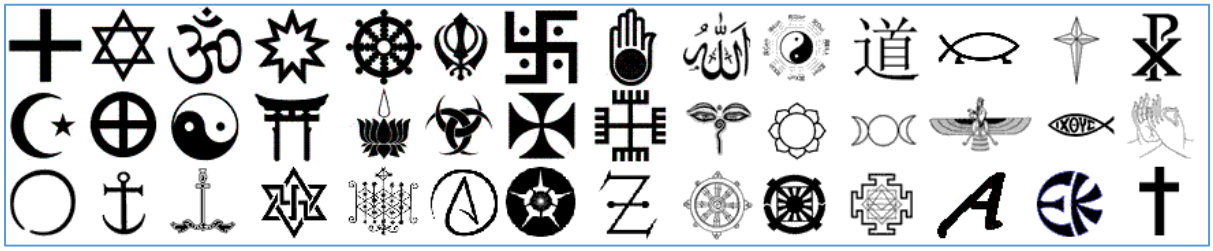

Figure 1: Religions and Their Symbols

Cognitive bias research, re-examining decades of work by social psychologists, produce a body of findings suggesting that a large selection of interpretative schemes of thinking and memory of symbols and signs today, biological, social, psychological, those involving sensorial faculties, have resulted in increasing public-private dissociation (Wagoner, cited in Wagoner, Jensen and Oldmeadow, 2012: pp. 135–42). Some cultural psychologists argue for the removal of symbolic consciousness that imbue or stimulate certain intended goals or messages in market

commodities, leaving signs and symbols to take the abstract rather than concrete forms (Ratner, cited in Valsiner, 2012, p. 210).

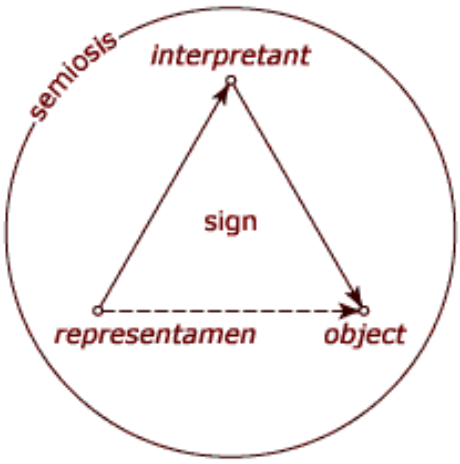

Figure 2: The Process of Semiosis

Symbolic perception of objects as meaningful signs is a sense-making activity which resides in the context of cultural and social groups. Charles Peirce (1976) elaborates that concept in Semiotic Triangle (Figure 2), acknowledging that objects used to represent something else have infinite semiotic capacity, since the equivocation of a sign is based on the decoding process, the degree of connection and relationship of the *interpretant* (signified message) to the *representamen* (sign), and mediation abilities of the interpreter (Salvatore, cited in in Valsiner, 2012, p.245). Semiotician Daniel Chandler (2017), detaching from de Saussure's pioneering model, bracketing the referent, builds on the social principle of meaning-making by noting that communication and entertainment media, films, photography, television, have succeeded in making indigenous symbolic codes arbitrary in reflecting reality, yet are still discernible as cultural texts so long as social codes and conventions are adhered to, or understood, by the sense-maker.

Figure 3: Contemporary Symbols

While transformation signify social progress, the basic question of ideologies remains. Transmittal of culture implies social adaptiveness and mainstream integration (Bodley, 2011) of aboriginal society, yet the arbitrariness of meanings of signs, symbols demonstrate modern societies' capability to retain their inherited fascination with icons that survived through time, while building layers of archetypal meanings into them. Postmodernists question current practices where symbols are appropriated for ideological and aesthetic purposes to create organisational "identity kits" (Davis & de Duren, 2011, p. 191). Kapferer (2004), for instance,

reframes symbolic heritage in the ideological values of brands, viewing symbolic expressions as the outflow of the urban social crisis: a desire for belonging and to participate in the economic wellbeing of mainstream cultures. Thus, in the case of icons and visual imagery that equate brands and consumer goods with idealised cultural consumption or social experiences (Figure 3), the degree of success in assaulting and manipulating mind-sets and choices have grown so successful that, when juxtaposed against simple graphic directional signs (Figure 4), perceptions of the latter's value are easily and casually downplayed, dismissed and ignored.

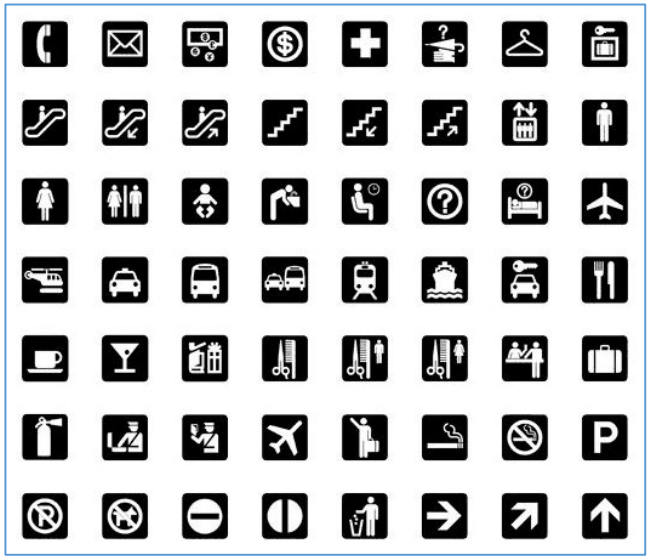

Figure 4: Graphic Directional Symbols

Research Methodology

Appropriating a suitable methodology of research for this paper was a key consideration. Literature pointed to large-scale tests as the most commonly administered evaluation of symbolism perception, involving psychological, sociological, behavioural and anthropological analyses of individual and group perceptions of a vast selection of symbols; their impacts of social construction of behaviour; and cognitive framing for the interpretation of signs, including physical and gestural symbolism, sound symbolism and symbolism in imagery. Such analyses require either a very specific or a large variation in demographics and a controlled testing environment to produce generalised results, before codification and examination based on relevant theories.

Literature review process provided a useful guidance for developing the scope of insight. To examine how symbols are incorporated into social narratives, the diverse meaning-making schemas of visual concepts and signs was the focus of interview questions. As stated by Polanyi (cited in Valsiner, 2012, p. 270), there is a tendency for symbolisms to produce friction in societies. The principle of *social experience* becomes a factor to know why this occurs, viz: *Primum vivere, deinde philosophari* ("Participants dwell in a culture first and foremost, analysis of their experiences come afterward").

At the concluding stages of secondary research, however, it was evident that perceptions towards symbolism are deep-rooted, subconscious and subliminal. It is assumed that the proliferation of symbols and their variegated perceptions are natural processes of cultural evolution, necessary to signify a pluralised, more inclusive, more connected global society.

Undertaking quantitative surveys would not capture subjects' subconscious reactions, as emotive and physiological dimensions are not invoked through the instrument of a standard questionnaire. To gain a critical interpretative analysis of symbolism, a less-structured methodology consisting of face-to-face interviews with scholars in relevant fields was chosen to be a more substantive and reflective method to evaluate subliminal responses, in comparison to statistical survey and data analysis.

Research Strategy and Collection Procedures

As the nature of symbolic social reality includes understanding rational and emotional responses, the use of semi-structured interviews was justified in attempt to map individuals' perspectives on the dialogic principle, since personal interviews provide researcher and subject opportunities to articulate, debate, disagree and to suggest alternatives. Interviewees were approached in face-to-face contact, and for confidentiality purposes are stated as Participant A (PA), a scholar in visual anthropology; Participant B (PB), an academic on the history of Islamic arts and researcher on indigenous and Islamic symbolism; and Participant C (PC), a journalist turned anthropologist and tattoo artist. The interviewees answered open ended questions in face-to-face sessions lasting two hours each to address the research questions. Notes from these sessions were transcribed. Several constraints were noted which mediated the results. As subjectivity is itself the symbolic environment of qualitative research, the specific expertise of participants produces the possibility of research bias. A control factor was the set of interview questions, designed to appropriate precise information from each. Being educators, however, participants' respective experiences do not necessarily impute similar social and cultural perspectives from the public. Nevertheless, participants' ages, ranging from 35 to 65 years, was a decidedly positive factor in enabling a range of depth perspectives. The following section collects the responses to key questions raised and discusses the findings.

Findings and Discussion

Participants spoke of symbols as "highly regarded" cultural information, texts, objects, visual material, icons of faith (e.g. the Cross, Star of David, Buddhist mantra, etc.) as well as geographical emblems. On society's perception and interpretation of symbols and what factors contribute to their transformation, PA assents the evolution of symbolic perceptions produces the variations adopted by religions, cultures, fraternities and societies. He illustrates the crescent and star, universally perceived symbols of Islam and its divine authority, as seen on the flags of Muslim countries, as having originated from ancient Sumeria and Persia, but modified later by the invading Ottoman Empire, adopted for decorative purposes over mosques. Islamic associative contexts of these emblems remain unclear, though as PA notes:

> It's a natural progress for symbols to represent completely different elements, but these perceptions would depend on the individual's historical framing and cultural worldview.

Role of Symbolism

Asked why establishing universal standards of meaning for indigenous symbols was important, PB states the evolution of symbols has "diluted perception of forms", as economic advancement, issues of urbanisation and other social problems distance societies from deep appreciation of contemplative subjects of the meaning of signs. Not having access to discourses about original conceptions of indigenous symbols leads to superficial perceptions and unresolved meaning.

PA cites the swastika, representing the circle of life and reincarnation in Buddhism and Hinduism, appropriated for military purposes, to represent Nazi Germany:

> After Hitler used [the swastika] the way he did, to most of the Western world, the SS now represents the Nazi . . . symbol of domination, power. Don't expect Western people to react to the original meaning. It once had a sacred, profound meaning and that is . . . lost now. Within the societies where that symbol originates, [the pure meaning] is still there. Still, [other people] who encounter the swastika today should be conscious of the symbol's misappropriation. Regardless of your culture, you should never use the swastika as your branding image just because you are a corporation that offers, say, solar energy [solutions].
>
> PC: I think while globalisation, celebrities, TV shows, the Internet, social media, the whole deal … contribute a great deal to the way things are perceived, the changes [brought about in the current uses] of symbols had started but, I think this has increased greatly in pace.

When asked whether the proliferation of misrepresented indigenous symbols could cause negative or unintended consequences, participants agreed perception problems arise, but political and cultural attitudes must also be accounted for:

> PA: Yes, they do. These symbols are part of history [but] the rapid increase of these symbols being used as logos and fashion statement shifts the focus away from the identity of the symbol, and towards the aesthetic value.
>
> PB: For indigenous groups who actually [use] certain symbols and forms, it's definitely annoying. When you [know] their symbol has a great deal of meaning to them, but you still accept its casual, thoughtless use . . . could cause racial and cultural issues. I think any ideology, right or wrong, could adopt symbolism in different forms to produce specific results. But that's not the fault of the symbols, you know, it's the perception.
>
> PC: Globalisation means that cultures are constantly meeting in today's world. 50 years ago, you wouldn't find a large community of Malaysians in the UK, for example. You wouldn't be watching TV shows and advertisements from other countries on the Internet and on television. That's what's happening today, so it is vital that there is awareness and understanding of each other's interpretations of symbolism and its significance.

Social Misuses and Misinterpretations

On their current social influences, PA highlighted symbolism's recent use as "fashion statements: clothing patterns, tattoos, emblems and logos of brands", and the analogical codes and metaphors calculated for preferences in consumption experiences, depending on how symbols are decoded and whether the analogies make sense culturally. PB adds:

> They play a superficial role, that's what they do. Form has become more important. No one thinks about the content, everything is [what I call] fast food cosmology. People want immediate results, and when they see an interesting symbol they don't go to find the root meanings, simply the outer look of the image

> and use them whichever way they like. If they were find out, I think it would be a kind of cultural shock.

When asked what issues could arise in cases where organisations or society deliberately misused or misinterpreted symbols, participants responded:

> PA: When I was a tour guide taking tourists to Penang, they were shocked and appalled at the sight of a big swastika sign outside a Buddhist centre. They thought that [the] place was a gathering for Neo-Nazis. Even after explaining what the swastika meant (to Hindus and Buddhists), they still seemed unsatisfied with my explanation and felt uncomfortable. Unfortunately, once a variation of a symbol makes its place in society and becomes famous, the identity of the symbol shifts from its origins.
>
> PB: This is actually a serious issue, but not seen as such. When you don't know something, then at least you don't have preconceived ideas about it and you are open to get educated about it. But when you have a little bit of information [from] here and there, you may believe that you do know, therefore you are closed to the education that will come. So, a little scattered knowledge of a symbol makes people use them casually, they may not feel the need to go or seek out the symbol's owners to understand their interpretation.
>
> PC: If one group demeans or devalues the cultural inheritance of another, problems [would] arise. When anything symbolic is ghettoized, the human brain trains itself to "cancel it out" from their thought processes. Trends cause this kind of cancellation. When we stop being subconsciously aware of symbols that have for centuries or millenniums been so vital to social interaction, cultural disintegration starts.

Restoring Meaning in Symbolism

Asked whether symbolism is losing its meaning and purpose and if at all, the meanings of these symbols can be restored, participants concurred. Conversely, global trends for simplified signs for functional communication purposes subsumes the process of restoration. Deviation or variegation of a symbol made to represent a new or alternative ideology becomes a subjective form of "experimentation", since political tensions are created out of misuse and misinterpretation.

Participants also agree that disintegration might be occurring due to unwise usage and the unstoppable power of information technologies in spreading misinformation, as noted:

> PA: To the average person, symbols are not losing importance, but rather, they are not used seriously. Information is abundant but media could spread falsities intentionally. I think awareness is important. Undoing this casual attitude towards symbols, getting people to think about what symbols mean to them and to other people, before placing them on clothing and on TV. But I don't think, in the current situation, it's anytime possible to see everyone [having the same], standardised opinions about symbolic images.
>
> PC: Personally, I am a fan of symbology, I try to discover information about the history of symbols, such as through media, websites and books. I like tattoos. If I

> walk into a tattoo parlour, I'd be quite interested if there were some historical information on these symbols [in their portfolio]. A big poster with information on symbols in tattoo parlours, or in trendy clothing outlets, can be both entertaining and educational.
>
> PB: [They are] losing their original meanings, but our awareness of that loss gives reasons to revive them. It's like when you get distanced from a source of inspiration; after a while you feel that distance, then the urge or thirst will return for you to rediscover that inspiration. In the old days, symbols meant what they meant; no one would write a thesis about [them].
>
> Well, there are many ways to educate. Media is effective, and sometimes, they use that power to restore meaning. Even so, we have to wait and see because both currents of change [run] side by side, one is our natural attachment [to historical knowledge], the other is using social tools [like media and entertainment] to restore original meaning. In between, something happens and I think overall, this can be a positive thing.

Analysis and Interpretation of Data

As stated by Goncu Berk (2013: pp. 63–65), global changes and social adaptation contribute to symbolic perception transformation from ancestral traditions. Although symbols have accumulated social roles, delineating significant cultural norms, standards of behaviour and codes, evidence from literature and the present research suggest we have lost our connection to indigenous symbols as a society. Symbolism is associated to how we conduct ourselves in society, so when symbols are liberated from their original meanings to indigenous cultures, then those independent or distorted interpretations produce conflicts and dissociations (Wagoner, Jensen & Oldmeadow, 2012). In the context of urbanism and globalisation, this paper contributes to an understanding of how symbols are perceived and interpreted through evolving times, mediums and usage.

Difference in perception and interpretation is a natural occurrence. How people perceive imagery is interlinked with image associations within their environment. Naturally, cultural upbringings produce different perceptions of the same icon or symbol. It is arguable, and may even be vital, for symbols to "reappear" as transformed imageries in order to survive the test of time, even if it means these variations dilute the original myths and meanings further (Wilkinson, 2009). Reversion of indigenous meanings for symbols, once transformed, is not always possible due to individuals and groups' discordant interpretations using dissimilar conceptual processes of cognition which produces different psychological values and behaviours. Symbols as the *surface embodiment* of the urbanisation phenomenon act as perfect material expressions of modern consumers' "spectacle" hence, becoming a common language that abstracts individuals' identities, bridging that loss of identity and "the world's loss of unity" (Debord, 1967, p.29), rendering its original purpose less salient. As a result, the personal connection with the object (sign) becomes more significant than past cultural codes which the symbol was made to represent.

The information sharing era offers digital media and communication technologies as chief mediation tools that shape ideological and cultural realities (Shoemaker and Reese, 2014; Weiss, et al, 2014). As a symbolic pseudo-environment, media influences truth perceptions and affects behaviours powerfully. Mediated perceptions of symbolic imageries may involve manipulation of reality for cultural information transfer (Shoemaker & Reese, 2014);

alternately, media provides an arbitrary range and choice of sense meanings and propaganda for different groups, "[preferring] none over another" (The Chicago School of Media Theory, 2017).

Qualitative research uncovered singular fascination with a familiar symbolism study case: the reinvention of the hooked cross, the swastika, an ancient Sanskrit symbol for auspiciousness, health and prosperity, appropriated by the Nazis (Heller, 2004, pp. 329–30; Julien, 2012, p. 157). Fixing symbols to certain ideologies distances and convolutes its original meaning for the next audience or group who reuse or reifies it. Hitler's "self-styled heroism" led to political appropriation of the indigenous sign, and the dictator's repurposing of the swastika's context was driven by a need to see would-be communists "[succumb] to the suggestive charm of such a grand and massive spectacle" that his emblem could represent (Heller, 2004, p. 330).

The implication of qualitative findings shows that overall, current scholarly efforts to trace indigenous symbols to their original identities and to delineate purpose are rendered difficult as limited access to authentic historical artefacts and endless symbolic misperceptions exists, posing a near-impossible challenge to identify symbolic elements' pure forms. Since accurate and acute symbolic construction of perceptions about signs and objects derive from memory, social experience, intuition and the subconscious, researchers should be more concerned with how perception transformation of a diverse array of symbols came to manifest in wayward interpretations.

This could lead to identifying and solving problematic issues on whether universal standards should be set in efforts to revive and regenerate the authentic, intended meanings of indigenous symbols. Even so, symbolisms incur understanding visual thinking, a challenge that is increasingly important for globally-connected societies advancing their economies into the 4th Industrial Revolution. Willemien Brand (2017) notes that the importance of visualisation to strengthen organisational culture, and to enable the creative dynamics of collaborative social groups to be harnessed for innovation. Since individual self-interest and participation are symbolic of social progress, the process of adaptation requires knowledge infusion and culture transmittal, and new standards of symbolic construction of social behaviours are keys to foster creative intelligence and to take advantage of opportunities for a more inclusive cultural revolution.

In summing this analysis, through this qualitative investigation, the pertinent issues addressed had been the perception transformation and interpretation of cultural and indigenous symbols on society. The impact of symbolic perception transformation on social liberation, and what it means for communities of practitioners, will now be discussed in the final section.

Recommendations and Conclusions

That we have a natural ability to be fascinated with anything of historical significance is obvious in the search to know more about ancient or retrospect art forms. Critical to keeping symbolic traditions alive would be initiatives and civic movements to rekindle public interest and encourage discourse about them. Nevertheless, as indigenous signs and symbols are orientated and integrated into globalised cultures, it is difficult to be sure of the original intended meaning which may be "good or evil" depending on how they are sanctioned and applied over time and who accepts [their] usage (Heller, 2004, p. 16).

Identifying symbols' value from a large range of interpretations is a task for cultural researchers which imputes aiming for interpretive balance between eternal and transitional valuation, and to exercise "creative license" in symbolic appropriation. To improve contextual awareness about symbolism, educators from fields such as early childhood education, anthropology, sociology, philosophy, art history, design, cultural studies and media communication need to learn to "see objects as representations of truths or deeper issues, such as the dual nature of existence" (Bruce-Mitford, 2008). Such awareness allows deeper reflection on symbols, enabling the construction of pluralised social narratives to promote symbolism's creative capacity for intercultural understanding. It is crucial to imbue audiences with symbolism's evolutionary history and their change processes, instead of regarding the transformation process as an inevitable erosion of indigenous cultures. By developing a broader, more inclusive range of discursive practices in the arts, design and humanities curricula, prominent spaces could be devoted to the exploration of symbolism's creative capacities from grounded historical conception and sensibilities, to increase awareness of symbolic perceptions among cultures.

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Images Credit

Figure 1: How many religions are there in the world? Retrieved from https://empoweryourknowledgeandhappytrivia.wordpress.com/2015/01/13/religion-timeline/

Figure 2: The process of semiosis. Retrieved from https://cseweb.ucsd.edu/~ddahlstr/cse271/peirce.php

Figure 3: Sacred Symbolism in the media. Retrieved from http://lofrev.net/brand-symbols-pictures/brand-symbols/

Figure 4: Explore these ideas and more! Retrieved from https://www.pinterest.com/pin/532550724657643990/

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An Improvement to Disruption Theory from a Macro Perspective: Evidence from the Personal and Mobile Computing Industries

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Abstract

This research studies the concept of disruptive innovation and its patterns from a macro perspective. By using quantitative and qualitative evidence from the personal and mobile computing industries, this research serves to corroborate Clayton Christensen's disruption theory, the main theory proposed today as an explanation of this phenomenon. It identifies the strengths and weakness of the theory, and builds upon it in order to propose an improved theory of disruption that takes into account the evolution of the market.

In order to measure disruption in the personal and mobile computing industries this research collected data for 58 product lines, including personal computers and smartphones from 1974 to 2015. A correlation analysis validated the foundations of Christensen's model, except for the distinction between incumbents and entrants. Other results showed the importance of radical innovation and architectural innovation, as well as the possibility of self-disruption. Further qualitative historical analysis corroborated these results.

The main finding of this research was identifying three different phases of disruption and proposing an original categorization for them: 1) disruption by creation of a new market, 2) disruption by mainstreamization of the market, and 3) disruption by commoditization of the market. This represents an improvement over the current understanding of the theory from a macro perspective.

Keywords: innovation, disruption, management, computing, mobile

Introduction

One key and not often discussed characteristic of Clayton Christensen's theory of disruption is the predictable and methodical manner in which disruption takes places in the market according to it. While the theory acknowledges that the ignition itself of disruption might be unpredictable, once disruption begins entrants disrupt incumbents in a methodical manner that is as much inexorable as it is systematic, at least according to the theory.

In disruption theory parlance, as a market evolves sustaining innovations overshoot customer needs and incumbent companies start over-serving the mainstream market. In turn, these gaps between performance's supply and demand allow for the emergence of disruptive innovations that lower performance, usually introduced by new entrant companies. Once a disruptive innovation takes hold in the low-end of the market, it relentlessly improves its performance and begins to move from the low-end to the high-end of the market, displacing in this process the previous technology and incumbent companies. Incumbents flight, instead of fight, and withdraw to the high-end of the market until they get cornered. Unrelenting, the disruptive innovation and entrant companies capture the mainstream market, and eventually the whole market including the high-end (Christensen, 1997, 2003).

Incumbent companies might become frantic at the late stages of this process once they realize that they are facing an existential threat, however until that point disruption had been building up slowly. According to the theory, disrupted companies go out of business two ways: gradually, and then suddenly. This is a reference to Ernest Hemingway that is often used to emphasize the slow buildup of disruption until it is too late (Sinofsky, 2013; Dediu, 2015; Thompson, 2016). Despite the attractiveness of this narrative, this research proposes that disruption does not take place in just these two stages. The historical evidence from the evolution of the personal and mobile computing industries is at odds with Christensen's characterization of the evolution of markets that get disrupted.

Infamously, Christensen predicted in 2007 that the iPhone was not truly disruptive and that it would fail against incumbent companies like Nokia (McGregor, 2007). Instead of being anecdotal, this miscalculation suggests that aspects of disruptive innovation have yet to be explained, and that the case studies of the personal and mobile computing industries can provide valuable evidence for improving disruption theory. Besides the iPhone, many product lines studied in this research did not fit Christensen's description of how a market evolves or gets disrupted.

In order to understand this problem this research analyzed quantitatively and qualitatively the history of the personal and industry from 1974 to 2015. The main finding of this research was identifying three different phases of disruption and proposing an original categorization for them: 1) disruption by creation of a new market, 2) disruption by mainstreamization of the market, and 3) disruption by commoditization of the market. This represents an improvement over the current understanding of disruption theory from a macro perspective.

Before presenting in more detail the results of this study, however, we need a precise understanding of the concepts of disruption theory.

The Theory of Disruptive Innovation

The confusion surrounding the concept of disruptive innovation has frequently been blamed on its popularization, as seen in Figure 1. Surprisingly, both supporters and detractors of the concept seem to agree on that (Danneels, 2004; Christensen, 2006, 2015; Dediu, 2014b; Thompson, 2013b; Gans, 2014; Lepore, 2014; Sood and Tellis, 2011; Yu and Hang, 2010; Yamaguchi, 2006).

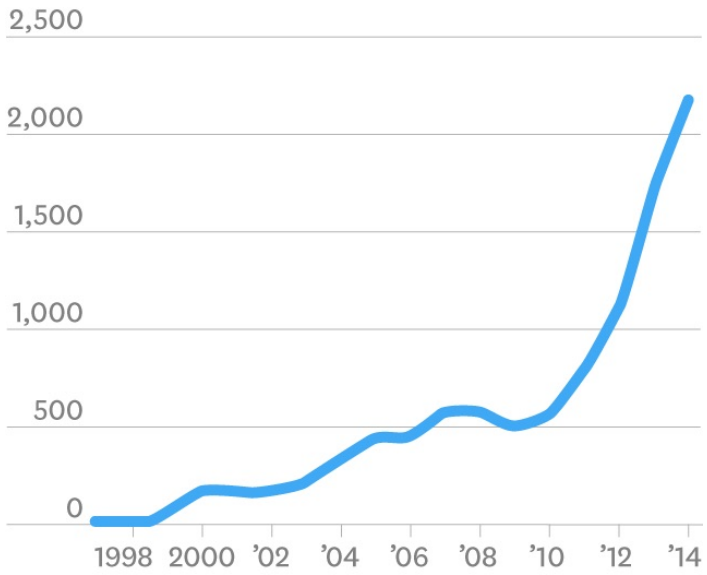

Figure 1: Number of articles using "disruptive innovation" and "disruptive technology" (Christensen, 2015).

While the popularization of the concept of disruptive innovation is true and has added to the polemic, this research considers that the problems in the understanding of disruption cannot be blamed only on this. There are profound disagreements inside academia in regard to disruption, and Christensen's conceptualization of disruptive innovation has been difficult to define, measure, and corroborate (Sood and Tellis, 2011). Furthermore, many of the most emblematic case studies of disruption have been questioned to date: disk drives (Nishimura, 2014; Lepore, 2014), personal computers (Thompson, 2013b), transistors (Yamaguchi, 2006), steel minimills and hydraulic excavators (Lepore, 2014).

Nowadays there are two main variants of the theory of disruptive innovation. In its orthodox interpretation disruption has come to mean the same as Christensen's theory of disruption (1997, 2003, 2006). On the other hand, a pluralistic interpretation considers the theory of disruption to be a broader field of study (Sood and Tellis, 2011; Schmidt and van der Rhee, 2013; Čiutienė and Thattakath, 2014; Gans, 2016). The pluralistic interpretation is the one preferred on this research, but the preeminence of Christensen's work as the father of disruption's theory is also acknowledged.

Christensen's theory of disruption is actually composed of two sub-theories: new market disruption, and low-end disruption (Christensen, 2006). Both theories share many concepts and study similar phenomena, however they have yet to be successfully unified into one consistent theory (Thompson, 2013a, 2014b). Christensen's latest effort for unification in an improved 'Theory of Disruption 2.0' (2016) is a work in progress that has yet to be tested and widely adopted by the research community.

Christensen (1997, 2003) has explained systematically the four key concepts of his original interpretation of disruption theory, shared both by new market disruption and low-end disruption. These four concepts are: 1) product performance, 2) sustaining technology, 3) disruptive technology, and 4) customer needs.

Product performance is a variable which measures the traditional dimension of performance of a product, or in Christensen's words "the dimensions of performance that mainstream customers in major markets have historically valued" (1997). For many products, performance is not just one dimension, but actually a combination of several dimensions in an intricate value proposition. Today, this abstract measure of product performance is frequently referred as "the basis of competition".

Product performance allows us to define sustaining and disruptive technologies. According to Christensen, sustaining technologies

> foster improved product performance. Some sustaining technologies can be discontinuous or radical in character, while others are of an incremental nature. What all sustaining technologies have in common is that they improve the performance of established products, along the dimensions of performance that mainstream customers in major markets have historically value. (1997)

On the other hand, disruptive technologies are

> innovations that result in worse product performance, at least in the near-term. Disruptive technologies bring to a market a very different value proposition than had been available previously. Generally, disruptive technologies underperform established products in mainstream markets. But they have other features that a few fringe (and generally new) customers value. (1997)

Despite their naming, disruptive technologies do not cause disruption by definition, although causation is implied. For Christensen a technology only needs to lower product performance in order to be called a disruptive technology. Because of this, other researchers prefer the term "potentially disruptive technologies" (Sood and Tellis, 2011).

Intuition would tell us that disruptive technologies should not succeed in the market since they offer worse performance. However, performance has to be understood in relation to customers. Customer needs are "the rate of performance improvement that mainstream customers demand or can absorb" (1997). Christensen found that the pace at which technologies performance improve is usually much faster than the pace at which customer needs increase. Because of this, in certain scenarios the performance of a superior traditional technology and an inferior disruptive technology can be equivalent for mainstream customers.

According to Christensen, is not the case that disruptive technologies underperform, but rather that traditional technologies overshoot mainstream customer needs. The views of the authors on this hypothesis and the relation between product performance and costumer needs can be found in a different paper soon to be published (Montoya and Kita, 2017). We believe that the jury is still out on this hypothesis, but Christensen's model can be adapted if needed.

These four key concepts: 1) product performance, 2) sustaining technology, 3) disruptive technology, and 4) customer needs, are all that is need to visualize disruption, which is frequently done as illustrated in Figure 2.

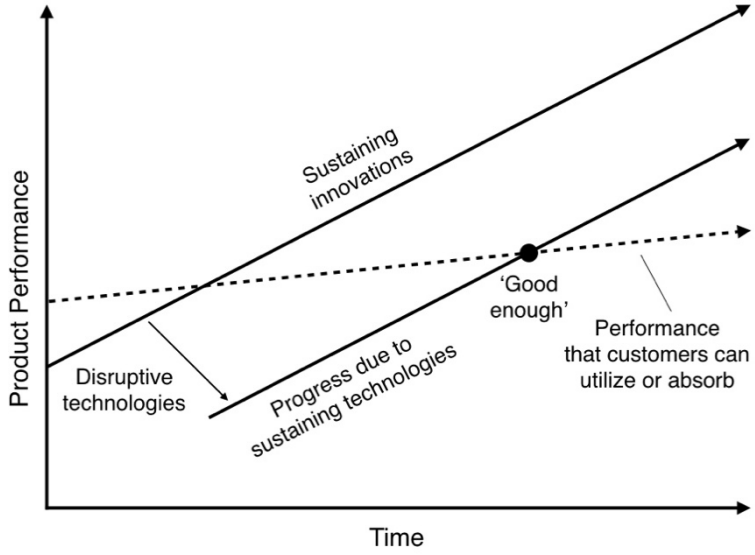

Figure 2: Trajectories of sustaining and disruptive technologies (Christensen, 1997).

As seen in Figure 2, once a disruptive innovation takes hold in the low-end of the market, it relentlessly improves its performance and begins to move from the low-end to the high-end of the market, displacing in this process the previous technology and incumbent companies. The disruption diagram and the four key concepts of disruption theory describe how disruption takes places, but not why it happens. The study of the causal mechanism of disruption has often focused on the innovator's dilemma from a micro perspective, in other words the reasons why managers at incumbent companies fail to fight entrants. However, disruption theory also has an implicit macro perspective.

From a macro perspective, the explanation of disruption varies slightly depending on which of two mechanisms of the theory are used. In the most common case, the process is explained in terms of achieving performance-competitiveness. Christensen described it using the case study of the computing industry as follows:

> In their efforts to provide better products than their competitors and earn higher prices and margins, suppliers often "overshoot" their market: They give customers more than they need or ultimately are willing to pay for. And more importantly, it means that disruptive technologies that may underperform today, relative to what users in the market demand, may be fully performance-competitive in that same market tomorrow.
>
> Many who once needed mainframe computers for their data processing requirements, for example, no longer need or buy mainframes. Mainframe performance has surpassed the requirements of many original customers, who today find that much of what they need to do can be done on desktop machines linked to file servers. In other words, the needs of many computer users have increased more slowly than the rate of improvement provided by computer designers. (Christensen, 1997)

However, the same disruptive process can be explained alternatively in terms of economies of scale. Using a more recent understanding of disruption pioneered also by Christensen (2003, 2006), Benedict Evans described the process of new market disruption using the same case study of the computing industry as follows:

> Until recently, the PC ecosystem was the centre of gravity of the tech industry: it was where the investment and innovation was centred. It took that role away from mainframes, minicomputers and workstations slowly and in stages over the previous 30 years or so. Crucially, though, PCs didn't start out selling to customers of mainframes, minicomputers or workstations - rather PCs were able to access a new and much larger pool of customers, and that gave PCs scale that, a decade or two later, allowed them to replace almost everything else. PCs could be sold to so many more people that their economies of scale became overwhelming. Eventually, there was no way that, say, the workstation industry could match the investment of the PC industry, and Sun and SGI were overtaken. And today, even a 'data centre' just means millions of 'personal computers'. Ecosystem scale won. (Evans, 2016)

While disruption through performance-competitiveness is a direct process that is a consequence of customers' choices in the market, disruption through economies of scale is an indirect process that is caused by changes in the supply chain. On the later explanation suppliers and investors play a role as vital or more than customers.

It must be stressed that these two types of macro explanations frequently overlap, as the case study of the computing industry shows. One explanation is not intended to replace the other, both are explanations from a macro perspective and use shared concepts, but they describe different aspects of disruption. For the purposes of this research we have decided to focus on their most important common characteristic, which is they way disruption is described as a gradual and almost methodical process from a macro perspective, regardless of whether it is low-end or new market disruption.

The effect desired by the above descriptions from Christensen (1997) and Evans (2016) is to stress the inevitability of disruption. Fatalist descriptions are the norm in studies about disruption (Lepore, 2014). But in their effort to stress the final upheaval of the market, researchers have paid less attention to the evolution of the market and the possibility of phases in disruption. In Christensen's model, previously shown in Figure 2, disruption takes place steadily, and the focus is on how the disruptive technology overtakes the previous technology 'eventually'. But how and by whom is the disruptive technology propelled is not considered in detail by the model, it is assumed that the disruptive technology gets better simply by sustaining improvements, and that the participants in the market (entrants and incumbents) remain the same throughout the whole process.

Besides the key four concepts previously explained, an additional concept called 'the innovator's dilemma' has been proposed by Christensen as the causal mechanism that enables disruption from a micro perspective. This concept deals with the managerial reasons why incumbent companies under disruption are almost always unable to fend off the treat of disruptive technologies. The innovator's dilemma has been the focus of ample research, both for and against it (Danneels, 2004; Christensen, 2006, 2015; Dediu, 2014b; Thompson, 2013b; Gans, 2014; Lepore, 2014; Sood and Tellis, 2011; Yu and Hang, 2010; Yamaguchi, 2006). While acknowledging the importance of this debate, this research does not focus on the micro

perspective of disruption or the innovator's dilemma, instead this research addresses the problem of the causal mechanism of disruption from a macro perspective.

Methodology

In order to measure disruption in the personal and mobile computing industries data for 58 product lines was collected, including personal computers, smartphones, personal digital assistants (PDA), tablets, and operating systems from 1974 to 2015. Each product line should be understood as all versions of a product from its introduction until its discontinuation as seen in Table 1.

Table 1: Product lines in the computing industry.

Product line	Company	Introduction year	Form factor
Altair 8800	MITS	1974	Personal computer
Atari 400/800	Atari, Inc.	1979	Personal computer
Commodore PET & 64	Commodore	1977	Personal computer
Commodore (Amiga)	Commodore	1985	Personal computer
TRS-80	Tandy Corporation	1977	Personal computer
Olivetti M24	Olivetti	1983	Personal computer
ZX80 & ZX Spectrum	Sinclair	1980, 1982	Personal computer
IBM PC	IBM	1981	Personal computer
Compaq Portable	Compaq	1982	Personal computer
HP series 80	Hewlett-Packard	1980	Personal computer
HP Pavilion / HP branded Compaq Presario	Hewlett-Packard	1993, 1995	Personal computer
Dell (online store)	Dell	1996	Personal computer
Packard-Bell	Packard-Bell	1986	Personal computer
PC-8800 and PC-9800	NEC	1981	Personal computer
Fujitsu Micro (FM)	Fujitsu	1981	Personal computer
Toshiba T1100	Toshiba	1985	Personal computer
Acer Aspire	Acer	1995	Personal computer
Asus Eee PC	Asus	2007	Personal computer
Lenovo ThinkPad	Lenovo	2005	Personal computer
Xerox Alto & Star	Xerox	1973, 1981	Personal computer
Apple I and II	Apple	1976, 1977	Personal computer
Lisa	Apple	1983	Personal computer
Macintosh	Apple	1984	Personal computer
NeXT Computer	NeXT	1988	Personal computer
Newton	Apple	1993	Handheld device
Palm Pilot	Palm	1996	Handheld device
Palm Pre	Palm	2009	Handheld device

Blackberry	RIM	1996	Handheld device
BlackBerry Z10	RIM	2013	Handheld device
Nokia 7650 (Symbian OS, S60 platform)	Nokia	2002	Handheld device
Nokia Lumia	Nokia	2011	Handheld device
iPaq and HTC Canary	HTC	2002	Handheld device
HTC Dream	HTC	2008	Handheld device
iPhone	Apple	2007	Handheld device
Motorola Droid	Motorola	2009	Handheld device
Samsung Galaxy	Samsung	2009	Handheld device
Xiaomi	Xiaomi	2010	Handheld device
Lenovo branded as Motorola	Lenovo	2014	Handheld device
Oppo	BBK	2008	Handheld device
Vivo	BBK	2009	Handheld device
iPad	Apple	2010	Tablet
HP Compaq TC1100 (Microsoft Tablet PC)	Hewlett-Packard	2002	Tablet
Surface	Microsoft	2012	Tablet
Android (Tablet)	Google	2011	Tablet
BlackBerry PlayBook	RIM	2011	Tablet
HP TouchPad	Hewlett-Packard	2011	Tablet
Kindle Fire	Amazon	2011	Tablet
MS-DOS	Microsoft	1981	Operating System
Windows	Microsoft	1985	Operating System
Microsoft Tablet PC	Microsoft	2002	Operating System
Windows CE, Pocket PC, Mobile	Microsoft	1996	Operating System
Windows Phone	Microsoft	2010	Operating System
Linux (desktop)	GNU GPL	1991	Operating System
OS/2	IBM (partly Microsoft)	1987	Operating System
BeOS	Be Inc.	1991	Operating System
NeXTSTEP	NeXT	1993	Operating System
Android	Google	2008	Operating System
Symbian	Symbian Ltd. (Nokia)	1997	Operating System

Instead of using a random sample, this dataset was built by exhaustively collecting information on as many product lines as we could identify, in such a way that the sample resembles the population as much as possible in order to avoid selection bias. We believe this dataset to be comprehensive and are not aware of important omissions (Reimer, 2005, 2012a, 2012b; Dediu, 2012b), but keep working on expanding it.

Spearman correlation was calculated across 18 dummy variables: 10 independent variables represent concepts about innovation, and 8 dependent variables represent market effects. To corroborate the validity of this test it was confirmed that the results of Spearman's coefficient, Pearson's phi coefficient, point biserial correlation, and Kendall's tau-b were exactly the same for the dataset employed in this research, however the preferred interpretation is Spearman correlation.

Following Sood and Tellis (2011) this researched first attempted to define disruptive technologies strictly as "innovations that lower product performance", regardless of their market effects (Christensen, 2006; Sood and Tellis, 2011). However, this approach probed insufficient, because of this more variables and flexible definitions were introduced to reflect the variety of interpretations present in disruption literature today.

Five of the independent variables represent concepts from the orthodox interpretation of Christensen's theory (1997, 2003, 2006), they are: entrant, worse performance, shifts basis of competition, new market disruptive innovation, and low-end disruptive innovation. The other five independent variables represent concepts from the pluralistic interpretation of disruption based on alternative theories, such as the research of Sood and Tellis (2011), Schmidt and van der Rhee (2013), Dosi (1982), and Henderson and Clark (1990), they are: first mover, high-end, self-disruptive intent, radical innovation, and architectural innovation. The definitions for each variable are presented below:

- Entrant: Was the company who developed the product a new entrant to the industry at the time of its introduction as Christensen proposes?
- First mover: Was the product introduced to the market before mainstreamization took place as Sood and Tellis propose?
- Worse performance: Did the product worsen performance in the dimension historically valued by customers as Christensen proposes?
- Shifts basis of competition: Did the product shift competition from the dimension historically valued by customers to a new dimension as Christensen proposes?
- New market disruptive innovation: Does the product conform to Christensen's definition of new market disruptive innovation?
- Low-end disruptive innovation: Does the product conform to Christensen's definition of new market disruptive innovation?
- High-end: Was the product high-end in comparison to other products in the market at the time of its introduction, as Schmidt and van der Rhee propose?
- Self-disruptive (intent or risk): Did the company intentionally introduce a product that carried the risk of self-disruption, as Sood and Tellis propose?
- Radical innovation: Did the product introduce a radical innovation as defined by Dosi?
- Architectural Innovation: Did the product introduce an architectural innovation as defined by Henderson and Clark?

On the other hand, the eight dependent variables represent market effects. Besides studying disruption as a whole, more discrete market effects are also considered:

- Disrupts market: Did the product disrupt the market conforming strictly to Christensen's model: the capture of most of the market starting from the low-end?

- Disrupts market (flexible): Did the product disrupt the market according to a more flexible definition based on the pluralistic interpretation of disruption: the capture of substantial market or profit share?
- Creates market: Did the product contribute to the creation of a new market?
- Expands market: Did the product contribute to the expansion/mainstreamization of the existing market?
- Commoditizes market: Did the product contribute to the commoditization of the market?
- Self-disrupts (effect): Did the product cannibalize different product lines of the company?
- Success in market: Did the product succeed in the market taking into account the size of the market at the time?
- Lasting success: Did the product succeed for a long time in the market?

Notes and Limitations

The categorization was done using binary variables whose value was assigned by the authors after researching every product's history in detail. While the use of binary variables introduces limitations, they also help to avoid a common problem of variables with more than two possible values, which is the accumulation of observations that are assigned an intermediate value when in doubt. For example, a value of 3 in a scale of 1 to 5 that tries to measure 'disruptiveness', which defeats the purpose of categorizing. We found that the additional level of detail of polytomous variables with multiple values did not reflect a real increase in certainty.

This research considers disruptive innovation and other innovation types to be Weberian 'ideal types', a widely used concepts in social sciences. According to Weber, "an ideal type is formed by the one-sided accentuation of one or more points of view and by the synthesis of a great many diffuse, discrete, more or less present and occasionally absent concrete individual phenomena… In its conceptual purity, this mental construct cannot be found empirically anywhere in reality" (1903–1917/1949). This research adopts this methodology and considers innovation types and the other independent variables to be ideal types. That is to say useful idealizations that are rarely found in reality.

On the other hand, the dependent variables or effects of disruption in the market were actually measured using market share, and net profits. There are methodological difficulties in both approaches. Measuring disruption only in terms of market share poses a problem in young markets where first movers can capture a high market share with comparatively few unit sales. On the other hand, measuring disruption only in terms of net profits tends to over-represent companies in mature markets because the market is much bigger. For this reason, both measures were used together.

Results

The results for Spearman correlation are presented in Table 2.

Table 2: Spearman's rank correlation coefficient for at least $p < 0.1$

	Entrant	First mover	Worse performance	Shifts basis of competition	New market disruptive innovation
Disrupts market	-0.2880*			0.4699***	
Disrupts market (flexible)			0.2529	0.5958***	
Creates market	0.2281	0.35737**		0.3472**	0.5868***
Expands market		0.2576	0.2469	0.3126*	
Commoditizes market		-0.3849**		0.3185*	-0.2366
Self-disrupts (effect)				0.2896*	
Success in market			0.3958**	0.4715***	
Lasting success			0.3152*	0.3992**	

	Low-end disruptive innovation	High-end	Self-disruptive (intent or risk)	Radical innovation	Architectural Innovation
Disrupts market	0.3738**				
Disrupts market (flexible)		-0.2530*		0.2189	
Creates market	-0.3687**			0.5620***	
Expands market					0.5650***
Commoditizes market	0.6869***	-0.2991*		-0.2654*	
Self-disrupts (effect)			0.7658***		
Success in market	0.4308***	-0.4812***			
Lasting success			0.2957*	0.2820*	0.4128**

One star (*) if $p < 0.05$, two stars (**) if $p < 0.01$, and three stars (***) if $p < 0.001$

As seen in Table 2, being a new entrant correlates negatively with with disruption of the market according to Christensen (-0.2880*), the opposite of what the theory suggests. This contradicts the aspects of Christensen's theory that rely on the distinction between incumbents and entrants.

Being a first mover correlates positively with the creation of new market (0.35737**), but negatively with the commoditization of the market (-0.3849**).

Worse performance correlates positively with success in the market (0.3958**), lasting success (0.31524*), and disruption of the market based on a more flexible interpretation (0.2529), but not with Christensen's strict definition.

Shifting the basis of competition correlates strongly with almost all measures of disruption: disruption of the market according to Christensen (0.4699***), disruption of the market based on a more flexible interpretation (0.5958***), creation of a new market (0.3472**), expansion

of the market (0.3126*), commoditization of the market (0.3185*), self- disruption (0.2896*), success in the market (0.4715***), and lasting success (0.3992**).

The notion of 'basis of competition' is a more powerful concept than 'worse performance' in predicting disruption, however it requires more interpretative work (Nishimura, 2014; Dediu, 2012g; Christensen, Raynor, McDonald, 2015).

As expected Christensen's new market disruptive innovation correlates positively with the creation of a new market (0.5868***), and negatively with the commoditization of the market (-0.2366***). Likewise, Christensen's low-end disruptive innovation correlates positively with the commoditization of the market (0.6869***), and negatively with the creation of a new market (-0.3687**).

Being high-end correlates negatively with most measures of disruption. This raises doubts about the possibility of high-end disruption. However, the intent to self-disrupt correlates positively with effects of self-disruption in the market (0.7658***) and lasting success (0.2957*). This result tells us that the concept of self-disruption is promissory.

Radical innovation correlates positively with the creation of a new market (0.5620***), and is a predictor as powerful as Christensen's new market disruptive innovation. On the other hand, architectural innovation correlates positively with expansion of the market (0.5650***) and is its strongest predictor. Architectural innovation is also the strongest predictor of lasting success (0.4128**).

The correlation analysis gives Christensen's theory a very good score. Christensen's theory was controversial at its time for its counterintuitive findings, and today is still strongly criticized by many, however this research validates Christensen's theory. However, some unexpected results were found: being a new entrant does not contribute to disruption, radical innovation and architectural innovation explain things disruptive innovation alone cannot, and self-disruption is possible.

Phases of Disruption

Research has showed that the computing industry is rich in examples of products that lowered the performance in dimensions historically valued by costumers (Montoya and Kita, 2017). In the history of the computing industry the fast pace of improvement of Moore's law frequently generated gaps in which customer needs for raw computing were temporally over-served, and this created opportunities for innovations that temporally worsened performance. Companies were confident that Moore's law would bring improvements later.

In Christensen's model disruption takes place steadily. This might be the case for mature markets where the size of the market is known, however in immature markets disruption can take place at the same time that the market grows. This research found that Everett Rogers' concept of the technology adoption life-cycle (1962) and Geoffrey Moore's concept of the 'chasm' (Moore, 1991, 2001) offer a more detailed description of evolving markets than Christensen's theory. This model can be seen in Figure 3.

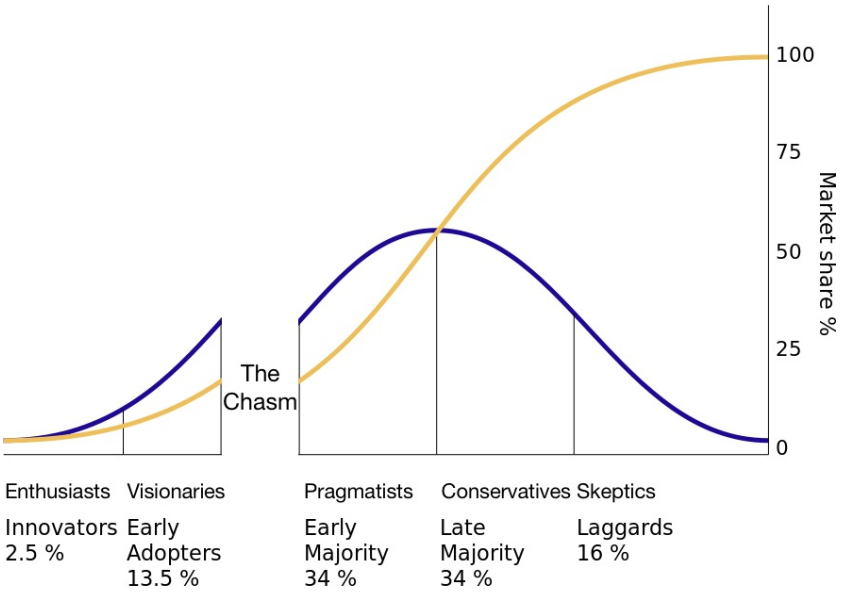

Figure 3: Rogers's technology adoption life-cycle and Moore's chasm (Moore, 1991).

Using historical analysis this research identified three different phases of disruption: 1) disruption by creation of a new market, 2) disruption by mainstreamization of the market, and 3) disruption by commoditization of the market. The timing of these phases can be seen in Figure 4.

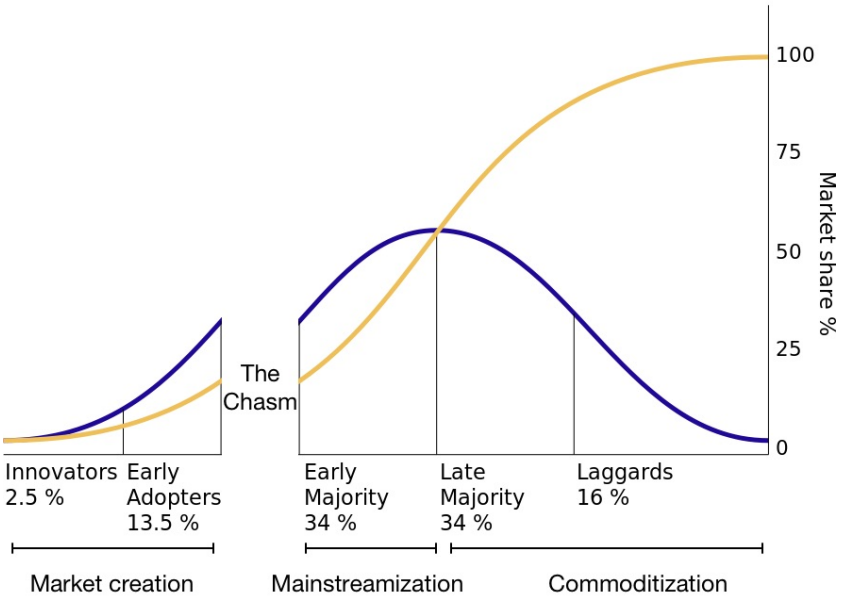

Figure 4: Three phases of disruption identified by this research.

Disruption by Creation of a New Market

The creation of a new market can be seen in the early stages of the personal computing and mobile computing industries respectively. Some examples in personal computing include: Altair 8800, Commodore PET, TRS-80, Atari 400 and 800, and Apple I and II. And some examples in mobile computing include: Newton, Palm, Windows CE, and BlackBerry. Without

the companies who introduced the first products in new categories, these industries would not exist at all today. Many first movers were able to succeed at first, however not all of them succeeded for a long time.

Behind the first personal computers was a radical innovation, as defined by Giovanni Dosi (1982). The first commercial microprocessors in the early 70s (specially Intel 4004 and 8008), which incorporated the functions of the CPU on a single integrated circuit, allowed for a new market of cheaper and smaller computers.

Old incumbent companies (Olivetti, Hewlett-Packard, Commodore International) and young entrant companies (MITS, Atari, Sinclair Instrument, Apple) alike were able to enter the market and succeed in this early phase. There was no difference between incumbents and entrants as Christensen's theory predicts.

A similar pattern can be found in the emergence of personal digital assistants (PDA) and smartphones. Behind this new product category was also a radical innovation: low-power microprocessors in the early 90s (specially ARM), which enabled a new market of handheld computers.

Although the Newton was a flop for Apple and was discontinued, other companies' products where able to succeed in the early phase of the market, including Palm, Windows CE, and RIM's BlackBerry. These products were key in creating a new market and their success was considerable for a young market in the 90s, however they have been eclipsed by the huge growth of smartphones in the 2010s.

Disruption by Mainstreamization

After a first wave of products shows the viability of a new market, there is still uncertainty about the size of that market. A second wave of products expands the market to its full potential through mainstreamization. Some examples in personal computing include: Xerox Alto, Xerox Star, Macintosh, IBM PC, and Windows. And some examples in mobile computing include: iPhone and Android.

Mainstreamization is dependent on crossing Moore's chasm. According to Moore,

> whenever truly innovative high-tech products are first brought to market, they will initially enjoy a warm welcome in an early market made up of technology enthusiasts and visionaries but then will fall into a chasm, during which sales will falter and often plummet. If the products can successfully cross this chasm, they will gain acceptance within a mainstream market dominated by pragmatists and conservatives". (2001)

The path to crossing the chasm can be found in the development of a "whole product," or more precisely a "dominant design". According to Anderson and Tushman "a break through innovation inaugurates an era of ferment in which competition among variations of the original breakthrough culminates in the selection of a single dominant configuration of the new technology". (1990)

Henderson and Clark have tied the development of dominant designs to architectural innovation: "the reconfiguration of an established system to link together existing components in a new way" (1990). Joshua Gans (2016) has been a promoter of connecting this research to Christensen's theory. This research found that the mainstreamization of the personal and

mobile computing markets was generated by the emergence of dominant designs through architectural innovation.

In the case of personal computing, the first personal computers such as the Altair 8800 and Apple II were products catering to technology enthusiasts in the 70s. The IBM PC targeted the mainstream market in 1981, but it was still difficult to use. The dominant design that helped cross the chasm in personal computing was the result of an architectural innovation in the mid 1980s: the development of the Graphical User Interface (GUI).

While the level of originality of Xerox, Apple, and Microsoft in developing the GUI can be argued – as several lawsuits attest the accusations of copying are not black and white – from an academic point of view all three companies deserve to be credited for the early adoption of the GUI and helping the mainstreamization of the personal computing market. On the other hand, companies that were too late never won a foothold in the market. After the consolidation of the market, no alternative computing platforms were able to emerge: OS/2, NeXTSTEP, BeOS, AmigaOS 4, all failed.

This same pattern can be found in the mobile computing industry. Architectural innovation at Apple resulted in the iPhone, which helped define a dominant design for smartphones in 2007. This dominant design established multi-touch as the default interface of smartphones. Previous devices like the Newton and Palm introduced touch interfaces before, but they used a stylus and maintained old desktop metaphors that failed to pass the test of being a new dominant design.

Companies that were late in adopting the dominant design introduced by the iPhone stumbled in the market, such as RIM, Nokia, and Microsoft. In contrast, Google who quickly adopted the iPhone's design for Android in 2008 was successful.

Disruption by Commoditization

Disruption by commoditization takes places after no unforeseen growth of the market is expected. Sales come from the late majority of customers and the replacement cycle, and growth for a company comes at the expense of competitors' market share. Some examples in personal computing include: PC manufacturers like Compaq, Hewlett-Packard, Dell, Asus, Acer, and Lenovo. And some examples in mobile computing include: Android vendors like HTC, Samsung, and Xiaomi.

The main driver of commoditization are "efficiency innovations" that get rid of inefficient structures, unnecessary intermediaries, and reduce costs. As defined by Christensen, efficiency innovations "help companies make and sell mature, established products or services to the same customers at lower prices. Some of these innovations are what we have elsewhere called low-end disruptions, and they involve the creation of a new business model". (2014)

In the personal computing industry lowering performance was a common technique thanks to Moore's law. Because of this lowering performance had to come accompanied of other business innovations to disrupt the market. Entrants did not introduce efficiency innovations when they joined the market, instead they did it later as incumbents once they gained enough inside knowledge of the inefficiencies that could be fixed in their industry.

Examples of efficiency innovations in personal computing in the late 90s and 2000s include Hewlett-Packard's merge and acquisitions, Dell's just-in-time manufacturing and direct sales online, and Lenovo's leverage of the shift of the computing industry supply chain to Asia.

As for mobile computing, some of the examples are Samsung's vertical integration in manufacturing, and Chinese manufacturers Xiaomi, Vivo, and Oppo's model of rapid hardware iteration that leverages their closeness to the supply chain.

The cases of disruption by commoditization show us a picture that resembles the closest Christensen's understanding of disruption: market changes coming from low-end and business models innovations. However, a more detailed analysis reveals significant discrepancies, such as disruptors being more frequently incumbents instead of entrants.

Conclusions

This research found a significant statistical correlation between disruption and technologies that lower performance, just as suggested by Christensen. An even stronger correlation between disruption and technologies that shift the basis of competition was also found, however we caution that identifying these shifts can be highly subjective (Nishimura, 2014; Dediu, 2012g; Christensen, Raynor, McDonald, 2015).

Overall, the quantitative analysis made on this research validates Christensen's theory and most of its concepts, except for the distinction between incumbents and entrants, whose relation to disruption was the opposite of what the theory predicts. Managers, especially those at incumbent companies should be skeptic of Christensen's advice.

Concepts from the pluralistic interpretation of disruption also had mixed results: no evidence was found for high-end disruption, however self-disruption was found to be a promissory concept. Other innovation types like radical innovation, and architectural innovation also were shown to be useful in the study of more discrete market effects associated to disruption.

Further qualitative analysis helped to improve the understanding of disruption from a macro perspective. Using historical evidence this research found three phases of disruption according to the maturity of the market and proposed an original categorization: 1) disruption by creation of a new market, 2) disruption by mainstreamization of the market, and 3) disruption by commoditization of the market.

We also found a linkage between these phases and three different patterns of innovation depending on its type: 1) radical innovations tend to create new markets, 2) architectural innovations define the dominant designs which are needed for the mainstreamization of a market, and 3) efficiency innovations reduce costs and get rid of inefficient structures commoditizing the market.

Managers should be aware of these differences in order to pursue the right type of innovation in each market phase. In order to remain successful as a market evolves companies need to adapt and shift their strategies. Disruption is a concept bigger than disruptive innovation, and there is still place for radical innovation and architectural innovation. Further studies could explore other innovation types.

Finally, this research tended a bridge between disruption theory and separated bodies of research like Geoffrey Moore's chasm. We believe that the findings and contributions of this research have deep implications for disruption theory that go beyond the case study of the computing industry. Further research in other industries would be the next step for testing and improving these contributions.

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